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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Benefits Derailed in Forced Unionization

By Jeffry Beeler
CW West Coast Bureau

Middle-level computing personnel at U.S. railroads have apparently been targeted for unionization by an international labor union as part of a nationwide campaign to swell its membership rolls.

The Brotherhood of Railway and Airline Clerks (Brac), which already represents many of the railway industry's low-level computing employees such as programmers and operations personnel, now appears to be claiming a similar authority over the industry's system analysts and project leaders, who have traditionally been considered exempt from union control.

Take the case of the Union Pacific Railroad Co., for example. Earlier this year, Brac officials approached Union Pacific's management with a proposal that all 48 of the company's formerly nonunionized system analysts and project leaders be brought immediately into the union's fold. Brac's representation already extended to the company's programmers and other low-level computing personnel, according to David Cavanaugh, one of Union Pacific's system analysts.

At first, Union Pacific rejected the idea of unionizing its system analysts and project leaders, but when Brac threatened to call a general strike unless its demands were satisfied, management's resistance suddenly crumbled.

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Cary Letter Says IBM Not Obliged To Report TNF

By Nancy French
CW Staff

ARMONK, N.Y. — IBM last week denied any wrongdoing in failing to make public the fact that its line of photocopiers and its 3800 laser printer use a carcinogenic substance.

Full text appears on Page 4.

In a letter to the editor of *Computerworld*, IBM Chairman Frank T. Cary said CW's reporting showed ignorance of Environmental Protection Agency (EPA) regulations.

(Continued on Page 5)

A key feature of IBM's 3800 laser printer is the forms overlay negative that reduces the need for preprinted forms. In this 1975 photo, provided by the company with the introduction of the machine, an operator is shown inserting the film negative next to the printer's drum. The overlay is used to print complex designs on plain paper according to a programmed control.

'The Thing to Do': Don't Use 3800, Expert Cautions

By Bruce Hoard
CW Staff

BOSTON — "The thing to do is not use that machine."

That was the opinion of Dr. William Haseltine, a specialist in molecular biology of carcinogens at the Sidney Farber Cancer Institute here, when apprised of laboratory tests conducted on trinitrofluorenone (TNF), a carcinogen IBM has been using in two copiers and two printers for up to 10 years.

The machines in question are the Copier I and II copiers, the 3800 laser printer and the 3896 tape-document converter.

Haseltine based his opinion on the results of tests conducted by IBM, tests in which laboratory mice developed tumors after inhaling TNF and having it injected in them.

"I think there are probably health hazards," the Harvard Medical School associate professor of pathology said, referring to use of the IBM equipment.

"If there were studies in the literature that they knew about that said this compound induced tumors in animals, rats or mice, then it was [IBM's] responsibility to make sure it was safe before they marketed it. I think they were irresponsible."

IBM maintains that TNF, as used in

(Continued on Page 4)

Ordered to Pay User $1.1 Million

Honeywell Guilty of Fraud, Jury Finds

By Tim Scannell
CW Staff

NEW YORK — In what may be a first-of-its-kind situation, a major computer vendor has been found guilty in federal court here of fraudulently misrepresenting a computer system to a now-defunct company in order to meet a yearly sales quota.

Honeywell, Inc. has been ordered to pay $1.1 millon in damages to Robert Weinstein, former president of Triangle Underwriters, Inc., which was forced out of business in late 1974 as a result of an untested and inoperable H-110 computer system sold to the company four years earlier.

Honeywell has moved to dismiss the jury's verdict and will appeal the decision if its dismissal is denied, its attorney Thomas A. Shaw said.

Memoranda Surface

According to Honeywell inter-office memoranda introduced last February, the $120,000 H-110 computer was installed even though "60% of the programs [had] not been tested." Despite apparent shortcomings, the computer was delivered in December 1970 to meet established sales goals for that year, the memos said.

Although Honeywell was ordered years earlier to produce all documents related to the Triangle case, the memoranda did not surface until after nearly five years of pretrial proceedings. The existence of the memos was discovered in the course of taking depositions

(Continued on Page 8)

Supercontroller vs. Coax: Debate of '80s

By Brad Schultz
CW Staff

Product Spotlight

Supercontrollers that integrate data, voice, text and other information flows through a telecommunications network will find a home with many users in the 1980s, a number of management information systems (MIS) experts have predicted this year.

But these souped-up private automatic branch exchanges (PABX), which would consolidate telecommunications control, will "undoubtedly" compete with the concept of running the information flows to dispersed intelligent devices via coaxial cabling, according to International Resource Development, Inc. (IRD), a market research firm based in Norwalk, Conn.

It seems that old debates about whether to decentralize an organization's DP resources may be recapitulated as debates about whether to decentralize the processing of all forms of telecommunications that coaxial lines accommodate.

Many data communications users will adopt coaxial technology to greatly extend their rate of communications, since certain modulation techniques allow a coaxial line to run many data channels simultaneously [CW, Aug. 25]. But others may not, finding the cost of laying new cable prohibitive.

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Broadband Cable TV Net

NRC Unveils System 20 'Localnet'

By Phil Hirsch
CW Washington Bureau

SUNNYVALE, Calif. — System 20, a low-cost terminal-oriented data communications system that can support thousands of terminals on a broadband cable television network was introduced here last week by Network Resources Corp. (NRC), a recently acquired subsidiary of Sytek, Inc.

System 20, according to NRC research director Jose Picasso, allows transparent communication among all terminals within the network, provides for data encryption and interfaces to long-haul as well as other local networks. The system supports transmission of voice, video and facsimile concurrently with data.

Essentially, the new system consists of microprocessor-equipped terminal interfaces and other devices which control communication on a multichannel, frequency-divided cable TV network. Sytek/NRC refers to the latter as a "Localnet." System 20 components are the first in a series of Localnet product groups.

Each System 20 interface acts as a packet assembly/disassembly device for associated terminals. It also performs numerous other functions, such as speed/code conversion, error control and flow control.

Two Interfaces

There are two interfaces in the System 20 line. The Tbox serves single terminals, while the Tmux connects with up to eight RS-232C devices.

At the moment, only start/stop terminals can be connected to the Tbox and Tmux, but interface software for intelligent terminals based on the international X.25 standard will be announced "in about a month," according to marketing director Wayne Martson.

The Localnet cable is frequency-divided into 120 logical channels. Each channel services "200 or more" 9,600 bit/sec terminals.

CSMA/CD Subsystem

Basically, a terminal transmits through the Tbox or Tmux whenever it has data to send, but a sophisticated subsystem known as CSMA/CD (for carrier-sense multiple access with collision detection) minimizes interference.

Before data is output on the cable, the interface checks to see if other terminals are already engaging it. The message, when sent, must travel the length of the cable and come back to the sending point; otherwise, the bits are retransmitted after a preset interval which is different for each sending station. Retransmission also cocurs if the receiving terminal fails to send an acknowledgement message back to the sending station.

The cable provides a bit error rate of $1:10^{9}$, according to Martson. He added that automatic error detection and correction procedures built into the transmission format raise this to $1:10^{12}$ end-to-end.

"Immediate application areas" for System 20, Martson added, are sites with existing two-way CATV systems — such as office buildings, campus-type research parks, and multibuilding industrial plants. Commerical CATV systems, he added, represent a major future market. Today, most of these systems lack two-way transmission capability, but all of those now being installed are required by the Federal Communications Commission to be bidirectional.

"System 20 and the Localnet concept fill a technology vacuum that exists between baseband approaches, such as Xerox Corp.'s Ethernet, and long-haul distributed processing schemes such as Arpanet," said Martson. Ethernet, he explained, is limited to a maximum range of 2 km. A Localnet system can cover up to 50 km on a single coaxial channel. And because multiple, frequency-divided channels are employed instead of a single, time-divided channel.

Localnet's capacity is "orders of magnitude greater" than Ethernet's, even in local intrabuilding operations," Martson contended.

Included in the System 20 product line announced last week were four devices. The Tbox interface is priced at $995 and the Tmux costs $4,230. A Tverter is $3,500; it is located at the head end of the cable and links sending channels — which operate on one set of carrier frequencies — with receiving channels, which utilize different frequencies.

A somewhat similar device, known as a Tbridge, interconnects the Localnet with outside networks. The Tbridge costs $4,500.

This Week

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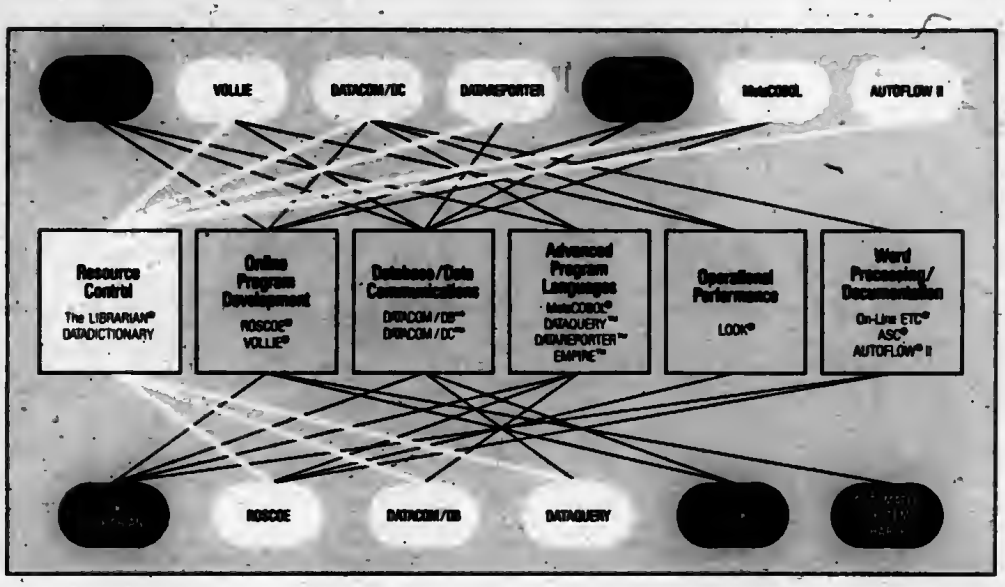

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Letter to the Editor

International Business Machines Corporation

Office of the Chairman of the Board

Armonk, New York 10504

September 9, 1980

Editor
Computerworld
375 Cochituate Road
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Dear Sir:

Your article "IBM Brass Knew TNF 'Possible' Carcinogen" (Computerworld, September 8) contains numerous factual inaccuracies as well as unsupported and false conclusions.

At no time before or after the introduction of our first Copier product in 1970 were safety concerns "dwarfed by management concerns over the profitability (or marketability) of that product." You base this erroneous conclusion on a word count of the summary minutes of certain IBM executive meetings. Obviously any such analysis does not reflect the amount of time spent or concern with any particular subject. What's really important is the fact that IBM's top management committees formally reviewed the possible toxicity of a product over ten years ago -- eight months before there was an Environmental Protection Agency and six years before there was a Toxic Substance Control Act. This review shows concern for employees and customers, not neglect.

You imply that for ten years IBM concealed from the EPA the knowledge that TNF is a possible carcinogen. That is incorrect. TNF's carcinogenic potential was described in the scientific literature at that time, as was IBM's use of the chemical in the copier photoconductor.

Your reporting also shows ignorance of EPA regulations. The statute which went into effect in 1977 requires companies to report only new toxicological findings. We had no new information to report until 1980, because our earlier tests only confirmed what was already known.

When new laboratory techniques became available, we resumed testing. The test results and analysis were received in 1980 and showed that TNF has oncogenic characteristics. We reported our findings to the EPA within 15 days, as required, and to our employees and customers as well.

Based on our studies we continue to believe that the way TNF is used in our Copier I and II and the IBM 3800 does not pose a health hazard.

Finally, to imply that Burke Marshall might have resigned from IBM over this subject is ludicrous. A telephone call to Mr. Marshall or to IBM would have confirmed that this was not the case.

Such a serious subject as the potential health effects of chemicals warrants balanced reporting and careful verification of the facts. Your unprofessional approach to this sensitive subject is not worthy of a major trade publication.

Sincerely,

Frank T. Cary

FTC/ai

EPA Had Option to Demand IBM Test Data on TNF

WASHINGTON, D.C. — Although IBM voluntarily turned over test data on a chemical used in its 3800 laser printer to the Environmental Protection Agency (EPA), the EPA easily could have demanded the information from the firm.

Under the Toxic Substances Control Act, enacted in late 1976, the EPA can order firms to release data on the production, use and health effects of chemical substances and mixtures. The EPA can also regulate the manufacture, processing, distribution and disposal of these chemicals, according to the law.

Recently, the EPA confirmed, through test data supplied by IBM, that trinitrofluorenone (TNF) is a definite carcinogen — capable of inducing gene mutations in bacterial and animal cells [CW, Aug. 25]. However, it is not yet known if the chemical is harmful to humans.

Basically, the Toxic Substance Act allows the EPA "to anticipate and address chemical risks before it is too late to undo the damage," according to an explanatory booklet offered by the U.S. Government Printing Office. The EPA can require that manufacturers or processors conduct tests on certain chemicals either to evaluate its toxicity or, in the case of TNF, determine whether it is carcinogenic or mutagenic.

Before requiring testing, the EPA must first find that (1) the chemical represents an unreasonable risk to health or environment; and (2) there is no sufficient data to determine just how the chemical will react on a person's health, with other chemicals or on the environment. Manufacturers of new chemicals must submit test data to the EPA at least 90 days before the manufacture and commercial distribution. However, existing chemicals can be examined if they are used for a unique application that might extend their exposure to humans or the environment.

In any case, if a chemical is found to be definitely harmful to humans, the EPA can either totally ban the manufacturer from making or using the chemical or limit the use of the chemical.

Any person or company that refuses to comply with any requirements of the Toxic Substances Control Act can be fined up to $25,000 for each day the law is violated in addition to any civil penalties.

Don't Use 3800, Expert Advises

(Continued from Page 1)

its machines, poses no health hazards to users.

When asked if the 2.6 micrograms of TNF that IBM said may be found on hard copy processed through the controversial peripherals is dangerous to humans, he echoed a sentiment frequently expressed by other experts: "There's no way of knowing without looking at human epidemiological [test] data from exposed populations."

The people who should be examined in order to determine what, if any, effects TNF has had on users, are those who service the machines and use them extensively, he added.

However, epidemiological studies have shown cancer's gestation period frequently exceeds the two years that have passed since the 3800 was introduced.

Haseltine linked the TNF situation with previous and similar cases by saying, "IBM should not do what has often been done and that is introduce a product and then withdraw it under pressure. That's highly irresponsible because whatever population has been exposed has already been exposed."

The pathologist was unsure as to whether the use of masks or gloves would mediate against any possibly dangerous TNF exposure. That depends on the route of exposure, which could come via touch or inhalation, he said, adding, inhalation is probably the more dangerous of the two.

"The fact of the matter is, there's no way of knowing what will happen to people. Therefore, if there is any indication TNF is dangerous, unless there's absolutely no substitute, you shouldn't use it."

Lawrence Garfinkel, vice-president for epidemiology and statistics with the American Cancer Society, warned against extrapolating animal test results to humans, but said of TNF, "The best thing would be for IBM to stop using it."

Choosing his words carefully, Garfinkel went on to say, "As long as a doubt exists from either bacterial or animal tests that it may be potentially dangerous, then most people would probably agree, if you can find a reasonable substitute, do it."

IBM has been requested to submit additional TNF test documentation to the Environmental Protection Agency, and until that information is obtained and studied, no conclusions should be reached concerning the carcinogen's potential, Garfinkel claimed.

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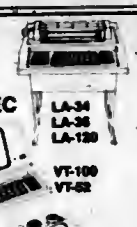
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Honeywell, Xerox, Uppster, Univac Say 'No'

IBM Alone in Using TNF, Informal Poll Finds

Interviews with four vendors who market high-speed nonimpact printers have indicated IBM is alone in using the carcinogen trinitrofluorenone (TNF) in any of its printing products.

IBM, which only recently acknowledged use of the chemical after knowing it was at least a possible carcinogen for 10 years [CW, Sept. 8], uses TNF in its Copier I and II copiers, 3800 laser printer and 3896 Tape-Document Converter.

Honeywell, Inc., Xerox Corp., Uppster Corp. and Univac all said "No" when asked if they use TNF.

They just don't seem to need it.

"We use a different fusing technique and different toner," a spokesman for Uppster Corp. said. "We use cold pressure fusing and pressure fused toner."

"We do not use that chemical in the laser printer," according to a Univac spokesman.

Horace Becker, vice-president for engineering at Xerox, said his company uses a technology in its copiers and printers similar to that employed by the 3800, but with one big difference: no TNF.

TNF in the 3800 emanates from the unit's photoreceptor, he claimed. "We hold the patent on the photoreceptor we had and IBM had to develop their own," he added. The two companies have clashed in court previously over alleged IBM patent infringements on Xerox's xerographic process.

However, Becker took issue with the argument that IBM's photoreceptor emits TNF, saying "This material does not come out of the machine." Apprised of conclusions reached by IBM that up to 2.6 micrograms of the chemical may be found on hard copy processed by the IBM machines in question, he replied, "I'm suprised it's that high. I didn't think anybody could measure it."

Changing photoreceptors could be a difficult and costly job for IBM. However, "there are different photoreceptors available," according to Ron Borelli, director of Page Printing systems operations at Honeywell. His company does not use TNF in its printer, he added.

IBM has expressed no interest in modifying any of its TNF-bearing machines, saying, "Under the conditions in which we were using TNF, in the photocopying process, it does not pose a health hazard."

Cary Denies Wrongdoing

(Continued from Page 1)

According to minutes from meetings of top IBM decision-making committees, IBM knew since before 1970 that the substance used in its photocopying process, trinitrofluorinone (TNF), is a carcinogen [CW, Sept. 8]. Cary, however, maintained the company was under no legal obligation to make that information public because the Toxic Substances Control Act did not become effective until 1977.

Cary said the act requires companies "to report only *new* toxicological findings. We had no new information to report until 1980, because our earlier tests only confirmed what was already known."

Cary further contended that IBM did not attempt to conceal TNF's carcinogenic effects: "TNF's carcinogenic potential was described in the scientific literature at that time, as was IBM's use of the chemical in the copier photoconductor."

"When new laboratory techniques became available, we resumed testing," Cary said.

One of the techniques to which Cary referred is known as the Ames technique and was developed in late 1975. It involves the uses of specialized bacterial strains that react differently to different compounds used as stimuli, allowing the measurement of potential mutagenic effects of those compounds, an IBM spokeswoman said.

"The test results and analysis were received in 1980 and showed that TNF has mutagenic characteristics. We reported our findings to the EPA within 15 days, as required, and to our employees and customers as well," he said in the letter.

The letter also denied IBM's top management was motivated more by potential profits than concern for user safety when it introduced its line of copiers and laser printer that incorporated use of TNF.

"Word count of the summary minutes of certain IBM executive meetings" does not reflect "the amount of time spent or concern with any particular subject.

"What is really important is the fact that IBM's top management committee formally reviewed the possible toxicity of a product over 10 years ago — eight months before there was an Environmental Protection Agency and six years before there was a Toxic Substance Control Act."

The letter did not help clarify the mystery over how documentation of that research may have benefited the average user of IBM photocopiers or the 3800 laser printer who may not customarily read scientific journals.

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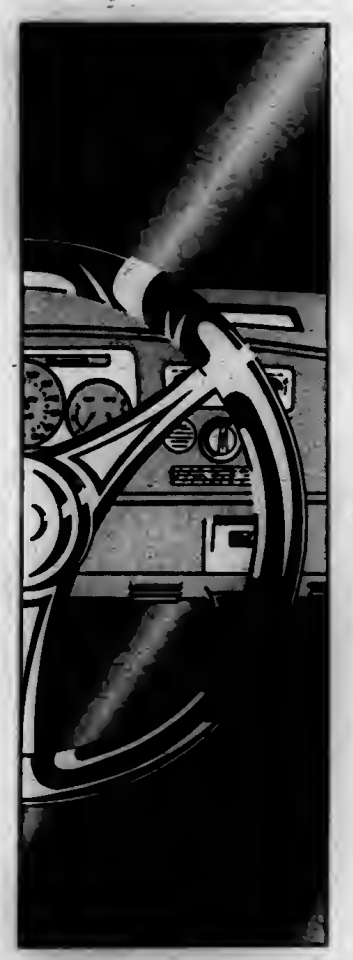

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IBM to Discount Extra System/370 Programs

By Marcy Rosenberg
CW Staff

WHITE PLAINS, N.Y. — Users of selected System/370 licensed programs will be able to trim monthly license charges for each extra copy by about 25% when IBM makes its Distributed Systems License Option (DSLO) available for these products Jan. 1.

On or after that date, users will still have to pay the full basic license charge for their initial program copy that runs on the primary CPU, but will then have the option of licensing any number of extra copies for each additional CPU at the DSLO discounted monthly rate.

Although IBM would not discuss in detail the criteria for DSLO eligibility, a company spokesman said one requirement was that only programs currently supported out of IBM Support Centers are included.

User Responsibility

Previously, System/370 programs could be licensed month-by-month under a basic license only, with DSLO offered as an option solely to users of 8100 Information Systems licensed programs.

To enjoy the cost savings DSLO provides, however, users will have to take more responsibility for software installation and maintenance and, in addition, give up certain protections provided under basic license.

For example, IBM will distribute directly to users basic license program copies only. But if opting to license additional copies under DSLO, the user will be responsible for copying and distributing to each DSLO location (CPU) tapes of the initial licensed program that IBM provided in machine-readable form to the customer's basic license location. Replicating object code tapes takes a fairly sophisticated user, the spokesman pointed out.

Customers must also shoulder the responsibility for installing and testing on each DSLO machine any new release, local fix, correction of bypass IBM provides on the basic license software.

This means that the basic license location — the one or more CPUs running programs licensed at full rate under a basic license agreement — serves as the focal point for direct IBM maintenance and support.

Problem Assistance

It is also through the basic license location only that customers can directly interface to IBM support centers for problem-related assistance. Therefore, if a software problem originates at a DSLO location, the user must replicate this problem at the basic license location for remote diagnostics and repair or, failing that, call for an on-site visit by an IBM field engineer to the basic license location.

The level of vendor field support differs for basic licenses and DSLO licenses. Customers licensing programs at full monthly rates are entitled to on-site support at each basic license location for either a flat monthly fee per program or payment on a time-and-materials basis per service call.

If choosing to pay flat monthly rates, these users pay the full charge for the initial basic license program copy and a reduced rate for each additional copy under basic license.

DSLO locations, on the other hand, are entitled to on-site service only when field engineers do not successfully correct the problem at the basic license location. Charges for a field visit at the DSLO location are payable on a time-and-materials basis only.

Other differences between basic and DSLO licenses relate to warranties and testing periods. Not all System/370 licensed programs are warrantable, but for those that are, IBM warrants under a basic license that the product "will do what we say it will do" for the user's given application.

Under DSLO licenses, however, "We are not warranting any program product that the customer has replicated to a secondary machine [DSLO location]," he explained.

Further, no testing period is allowed for DSLO licensed program copies, although users can test basic license copies.

Testing periods, depending on the program product, can last up to two months, during which time users can run their own live data and are not required to begin paying for the software until it is running in production.

There is no limit on the number of program copies that can be licensed under DSLO. And any IBM CPU that runs DSLO-eligible System/370 licensed programs — be it a 370, 30 series or 4300 processor — can serve as a DSLO location, the spokesman noted.

Under both basic and DSLO licenses, users pay for System/370 licensed progams on a month-by-month basis.

Union Eyes Railway Computing Staffers

(Continued from Page 1)

So late last June, all 48 of the company's system analysts and project leaders abruptly lost their status as independent employees and were formally annexed into Brac's membership.

As members of Brac, the employees were automatically reclassified as clerks, and their fringe benefits were downgraded accordingly. Thus, in joining a union, they immediately lost a week of vacation, had their life insurance coverage cut drastically and forfeited the privilege of participating in the company's profit-sharing, pension and employee-ownership plans.

For most of Union Pacific's systems analysts and project leaders, loss of the company's fringe benefit package represented a stunning reversal."Many of these people worked hard to earn their fringe benefits, but now they've all been taken away," Cavanaugh lamented. "The employees here have suddenly discovered all their years of hard work were for naught."

For each of the employees directly affected by the decision, news of Brac's unionizing coup came like the proverbial bolt out of the blue. Not until their union membership was already an established fact did the employees even dimly suspect that an organizing effort had long been under way, Cavanaugh said.

No one had ever asked the computing department staff members whether they considered union membership desirable, nor were they ever given an opportunity to vote on the matter, Cavanaugh said. Union membership was simply foisted upon them.

"We literally walked into work one morning and were told, 'Guess what, each of you is now a member of a union,' " he recalled.

To counter Brac's recent moves to unionize them, the Union Pacific computing personnel early this month petitioned an independent federal agency known as the National Mediation Board (NMB) to reject Brac's claim that it represents all the railway industry's middle-level management information systems (MIS) employees.

No one knows yet exactly when or how the NMB is likely to rule on the question, but Union Pacific's computing personnel are only mildly optimistic about the outcome. "In the past, the Board has seemed to be very pro-union in most of its decisions, and we've concluded our chances of getting a favorable ruling stand at only about 50-50," Cavanaugh said.

If things go well, the employees eventually plan to organize themselves into an autonomous bargaining unit and then decertify themselves in the hope their employer will take them back in their former nonunionized status, the system analyst added.

Union Pacific is not the only U.S. railway where Brac has unionized computing personnel without their prior knowledge or consent. Other companies where cases of forced unionization have lately been reported include the Missouri-Pacific Railroad Co., where an organizing attempt apparently flopped, and the Burlington-Northern Railroad Co., where such an effort appears to have succeeded but has since gone into litigation.

Brac is also rumored to have launched unionizing campaigns within other U.S. railways and is undoubtedly the driving force behind a recent organizing effort involving MIS personnel at Western Airlines, Inc. [CW, Aug. 18]

At Union Pacific, reaction to Brac's latest attempt to unionize the company's computing personnel has been frankly "indignant," Cavanaugh said.

Under the Railway Labor Act, Brac's authority to exercise its power is restricted to members of the loosely defined "clerical craft or class." In Brac's view, the "clerical craft or class" includes nonmanagerial computing personnel such as system analysts and project leaders, and the union has used that argument to justify its attempts to have those people unionized.

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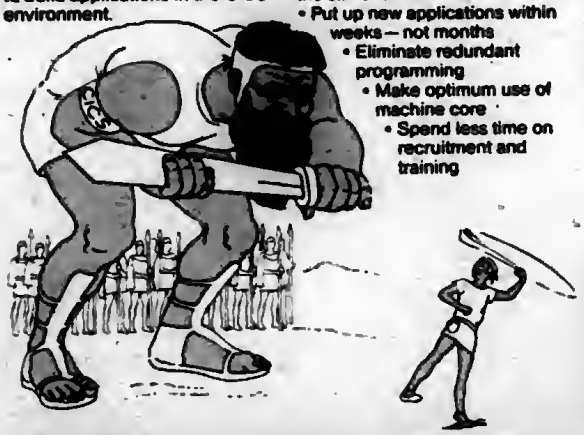

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Staff Resistance Found

Efforts to Unionize Airline DPers Grounded

By Connie Winkler
CW Staff

Union efforts to organize DP employees in the airlines have only gotten a few feet off the ground, according to a spot telephone survey of airline systems analysts and programmers last week.

Most individuals interviewed said they could never be forced into a union and classified as clerks even though that is just what happened at Western Airlines in Los Angeles last month (CW, Aug. 18).

The survey turned up only one case of unionization — the Braniff International DP shop. Here, entry level programmers — Programmer I grade employees — were brought in under the aegis of the International Brotherhood of Teamsters (IBT) in January.

Unions Nothing New

Data conversion and computer operations employees at Braniff have long been part of the IBT, John Bonness, vice-president of computer services, said. The 10 Programmer I level employees were included in the IBT in January without choice as part of union efforts, Bonness said.

The Programmer I employees who have been promoted have not been bothered by the fact they were moved out of the union. As for new employees who might be bothered coming into a union, Bonness said he didn't know how they would react — he has not hired any new programmers since January.

A Braniff staffer who, like almost all of the employees contacted, asked not to be identified, said the higher level management information systems workers have been assured by management that their jobs are not targeted for unionization.

He predicted the reaction of Braniff DPers to union organizing efforts would be "mixed." "Personally I would have to know a lot more about it, be assured of some of the specifics," he said.

The Braniff employee said working conditions there were better than other shops in the area, but pay was below average. "Braniff seems to have a policy of using airline benefits to leverage salaries," he said. "I'd like to have the situation slightly different: I'd like to see more effective communications."

Burned by Unions

At United Airlines, "people were very burned by the unions in the 1979 strike," one DPer said at the suburban Chicago computer center. She was referring to the April and May strike of United mechanics during which DP employees' pay was cut in half.

"We were never reimbursed," she said. "People forgave, but never forgot — there's a lot of bad sentiment toward the power of the unions."

Nevertheless, if a union approached United management information systems workers, she believes "most people would listen initially. Whether or not they would vote to unionize is something else."

Another United programmer said there is a possibility a union could get a foothold in the MIS function, but he had a "gut feeling it would not be too likely."

He guessed the United pay is about average for the Chicago area, but felt working conditions were better than average. United has hundreds of MIS employees working on two giant systems, an IBM-based administrative system and a Univac-based reservations system.

Keeping Low Profile

At the American Airlines DP headquarters in Tulsa, all the employees contacted were hesitant to talk about possible union inroads, although none of them had been contacted by the unions.

"People here don't want to talk about it — none of the airlines are doing too well and there's the possibility of layoffs," said one tight-lipped DPer. One MIS worker said he was opposed to unions and said American treated its employees pretty well, including the 200 in DP.

(Unions at American have attempted to extend their membership; most recently, the Teamsters sought to organize ticket agents.)

Eastern Airlines DPers do not expect unions to make much headway at their Miami operation. "Florida is a free state and because of that unions aren't prevalent in Miami," according to Steven Costa, a technical programmer at Eastern.

Costa called himself a conservative person who believes "unions are dragging this country down." If the Eastern MIS operation was unionized, Costa said he would look for another job.

The Eastern operation has a professional attitude and Costa believes employees are satisfied. At Eastern, programmers technical staff and the like are classified as management. The Eastern employee said he would object to being classified as a clerical employee. "We're professionals. We should be classified as something different than management or clerical."

Neither have there been any union overtures to DP employees at TWA's center in Kansas City, Mo.

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Supercontroller vs. Coax: Debate for 1980s

(Continued from Page 1)

Two Exxon Enterprises, Inc. affiliates presented both sides of the argument last May. Dallas-based Intecom, Inc. unveiled the Series 40 Integrated Business Exchange (IBX/S40), a supercontroller featuring a nonblocking switching matrix and redundant Perkin-Elmer Corp. 32-bit processors. The IBX/S40 is said to handle asynchronous and synchronous data calls in the 110- to 56K bit/sec range [CW, May 12].

Shortly afterwards, Zilog, Inc. of Cupertino, Calif. introduced a local data network architecture called Z-Net that gives the user coaxial links between distributed microcomputers [CW, May 26]. Zilog also makes the Z80 microprocessors within an IBX/S40's switching partitions.

During the week Z-Net debuted, Digital Equipment Corp., Xerox Corp. and Intel Corp. jointly announced Ethernet, a basic design for local nets closely resembling what the Institute of Electrical and Electronics Engineers seems ready to adopt as the industry standard.

According to IRD, supercontrollers can be attached to architectures like Z-Net or Ethernet without difficulty, but the extent to which they dominate local net traffic is a conundrum the data communications manager may not resolve easily.

In the U.S., only a few supercontrollers suitable for both data and voice communications are presently available. Those are offered by Intecom, Inc. of Dallas and Northern Telecom, Ltd. of Montreal.

Survey's Predictions

As for the future, IRD's recent market review of PABX, Interconnect and the Future Office Controller, predicted that IBM and Bell will accompany other vendors into the arena in the next few years.

Overseas, however, IBM has installed systems to switch both data and voice since the 1960s, only recently encountering stiff competition in that regard. Based on the 360 mainframe, IBM's 2750 switching system came to France in 1969 and had modest success. Three years later, the vendor's Data Processing Division gave Europeans a successor based on the 370 mainframe, the 3750 switching system.

But, for reasons both subtle and direct, Bell may prove the spoiler in the supercontroller sweepstakes. The world's largest telecommunications carrier is rumored to be building a juggernaut of a supercontroller in Colorado, code-named Antelope and expected to appear in the next few years [CW, Feb. 18].

With its circuitry already inside the buildings of most U.S. users, Bell may want Antelope to fit those wires snugly as an alternative to the costly overhaul that coaxial implementations might impose. But informed sources have told *Computerworld* that Bell's strategists remain divided on which switching techniques Antelope will utilize. These matters relate to how rapidly Bell wishes to replace its analog transmission facilities, which force computer users to run data through modems, with all-digital links.

Point of Contention

One point of contention among Bell planners, the sources said, is whether to endow Antelope with pulse code modulation, a switching technique featured by the Intecom IBX/S40 and Northern Telecom Ltd. SL-1 supercontrollers, but not by Bell's voice-oriented Dimension 100 and 2000 PABXs, which have pulse amplitude modulation.

Pulse code modulation involves sampling the analog waveform run through a telephone line at an 8KHz frequency and then coding each sample into an 8-bit digital packet. Sampling with pulse amplitude modulation usually occurs in the 8/16KHz bandwidth; pulses vary in amplitude as they are sampled and multiplexed onto a common signal bus.

For the user, pulse code modulation is often more expensive to implement than pulse amplitude modulation, but it is less subject to cross-talk and other distortions which can introduce errors into a data stream, IRD indicated.

According to an Intecom spokesman, supercontrollers come in two varieties. The Intecom and Northern Telecom Supercontrollers focus on the user's local environment, coordinating information flows within a single building or complex of adjacent buildings. Others, like a model American satellite Corp. announced earlier this year [CW, Feb.4], focus on the network, rendering services such as encryption to subscribers separated by long distances.

The Yankee Group polled 150 users of voice-oriented private branch exchanges (PBX) (sold by different types of firms) and Centrex systems (sold by telephone companies) to learn what they feel about upgrading to supercontrollers that integrate data and voice.

Among respondents employed by the 500 firms *Fortune* magazine designates as the nation's largest, 83% of PBX users and 86% of Centrex users said they would pay for integration of data and voice.

As to integration of data and text flows, the Yankee Group found that 55% of *Fortune* 500 PBX users and 79% of *Fortune* 500 Centrex users said they would pay for it in a switching system.

International Resource Development, Inc.'s report, "PABX, Interconnect and the Future Office Controller," is available for $985 from the firm at 30 High St., Norwalk, Conn. 06851.

"PBXs and Switching — The New Generation of Supercontrollers" was published in October 1979 by The Yankee Group as part of Its Communications Information Systems Planning Service. More information on that service is available from The Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138.

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Jury Finds Honeywell Guilty

(Continued from Page 1)

from individuals involved in the 1975 suit. The memoranda were reportedly crucial to the jury's recent awards decision.

Triangle Underwriters, an insurance broker originally located in Manhattan and later in Queens, purchased the H-110 tape-oriented mainframe to replace an IBM 360-20 card-based system. The Honeywell computer was slated to handle the company's billings, customer payments, insurance policy cancellations and keep track of the $5 million in business the company had with various insurance firms.

However, the system never worked. What's more, Honeywell personnel knew the system was not ready to handle Triangle's work load, but never let the company in on that fact, according to Honeywell internal memoranda.

Shipped to Meet Goals

"The system was [shipped] in 1970 to insure 1970 shipment goals would be met for the sales office, in spite of the fact that all programs were not complete, no systems test had been performed, nor had any parallel tests been performed," a Honeywell memo dated 1972 claimed.

Problems with the H-110 centered around Honeywell's plan to convert the IBM 360-20's RPG-II programs to operate in a Cobol environment, Paul Warner, national director of management services at the accounting firm of Mann Judd & Landau, said. Warner testified as one of several expert witnesses for the insurance firm.

To accomplish the RPG-II-to-Cobol conversion, Honeywell allegedly assigned a project leader "who they claimed had insurance experience" and two programmers, Warner noted. "One was fresh out of school and the other had some experience in Cobol." Even though "their RPG-II-to-Cobol manual stated that the people involved had to be experienced in both."

On-Line Disaster

Triangle did not realize that the system was inadequate until the computer was switched on-line. At that time, "billings were incorrect, commissions were in error, many agents were paid multiple times [and] some were not paid at all," a Honeywell internal memo revealed. In addition, "cancellations of policies were not handled properly [and] customer payments were not applied to their policies."

Honeywell installed the computer system "without ever completely even writing it," Howard Radin, another expert witness for the plaintiff, added. "They never ran a whole system test. Although the H-110 looked operable on paper, the system was "never able to run its business properly."

The defendent's lawyer, Thomas Shaw, declined to comment on the court's decision.

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M/A-COM Satellite Net Displays Broadband Power

By Phil Hirsch
CW Washington Bureau

BURLINGTON, Mass. — Transmission of a two-page letter in six seconds is one feature of a private satellite communications network which M/A-COM, Inc, headquartered here, plans to put into operation early next year. The system will be a showcase for demonstrating sophisticated hardware and software that replaces analog local loops with broadband, all-digit facilities.

Based on M/A-COM's marketing plans and those of other suppliers, it appears likely that this new technology will become generally available to data communications users within the next two years.

M/A-COM's upcoming private network — Macomnet —, will interconnect company headquarters here in Burlington with affiliates in Maryland, California and North Carolina. Two affiliates — Digital Communications Corp. (DCC) in Germantown, Md., and Linkabit Corp. in San Diego — are leading manufacturers of microwave and satellite communications equipment.

The third remote termination will serve Valtec Corp., which produces coaxial and fiber optic cable, as well as laser diodes. Backbone channels for Macomnet will be provided by Western Union's Westar satellite.

Initially, Macomnet will support teleconferencing, facsimile and electronic mail applications. Later, computer-to-computer data transfers will be added. The system is scheduled to begin operation early next year, assuming M/A-COM's soon-to-be-filed application is approved quickly by the Federal Communications Commission.

DCC Earth Terminal

The Westar satellite channel will interface at each of the four sites with an earth terminal recently developed by DCC. According to a company spokesman, this Dynac terminal costs about $50K "in limited quantities" and provides the benefits of time-division multiple-access at a far lower price than anything on the market today.

Initially, the earth station and its associated five-meter antenna will be connected by coaxial cable to multiple terminals located within a single building at each of the four sites. Later, multiple buildings in Burlington will be attached to the Macomnet using two other recently developed DCC products.

One is a cable-based switching and control subsystem called Capac that time-shares the cable capacity among multiple attached terminals, allowing them to communicate with each other and, through the Dynac earth station, with the outside world. The other subsystem, known as Rapac, is a microwave version of the same basic capability. Each can be modularly expanded to support "tens of thousands of terminals," according to DCC.

Satellite Business Systems

Satellite Business Systems (SBS) may be the first U.S. satellite communications carrier to make this broadband digital communications capability generally available end-to-end. Early next year, the company will launch a transcontinental data communications demonstration, utilizing a 56K bit/sec satellite channel connected to cable and/or microwave local loop facilities in New York and San Francisco.

Almost certainly, SBS plans to add similar facilities to its commercial network once the demo has shown the benefits. The satellite-local loop interface for the SBS test will consist essentially of DCC's Capac and Rapac subsystems.

In addition, Mitre Corp. has just licensed DCC to manufacture a new interface that permits multiple and varied data terminals to be connected to a community of antenna television system. For details, see story on Page 55.

Local Loops Link Satellites

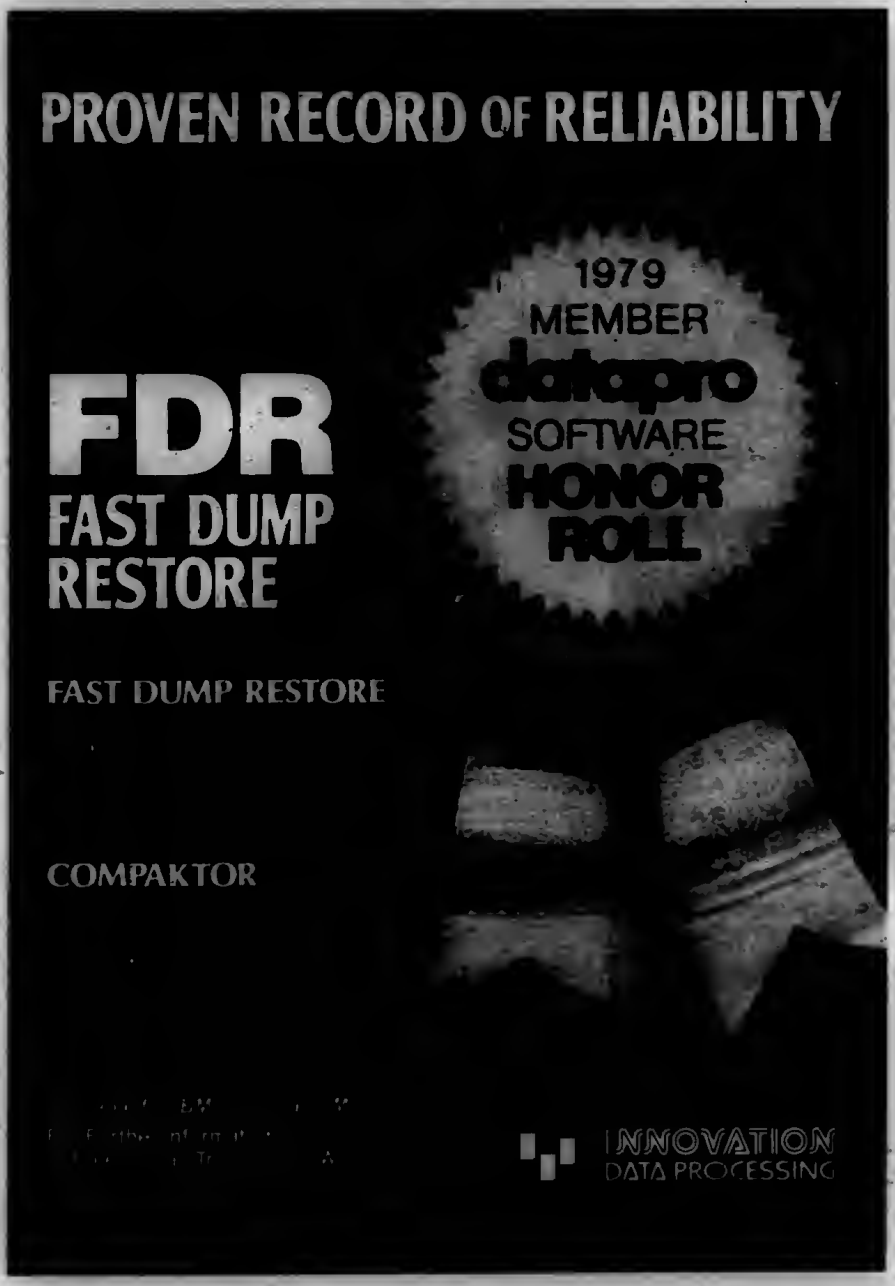
The basic architecture of satellite networks such as that developed by M/A-COM, Inc. consists of cable or microwave local loops connected to microprocessor-equipped network nodes.

Communications between the user's terminal and the node is typically at 256K bit/sec. On the network side, the node — through an associated earth station — is connected to a broadband satellite channel.

In addition to higher speed and the use of digital instead of analog format, this scheme employs time-division multiple-access (TDMA) software, which assigns satellite channel capacity to each pair of network nodes for a specified time interval. During this interval, data collected from the associated terminals is transmitted in bursts at rates up to 64M bit/sec.

Voice, facsimile and slow-speed video, as well as conventional data, can be transmitted concurrently. Moreover, point-to-point traffic can be intermixed with point-to-multipoint messages.

A basically similar capacity-allocation scheme is used on the microwave or cable link connecting the network node with its associated end points. Multiple send-receive channel pairs, each utilizing different carrier frequencies, connect the node with the remote locations. A single channel is shared by a number of remote end points.



There She Is, Miss . . . Oklahoma?

By Marguerite Zientara
CW Staff

DE KALB, Ill. — Statistics lie. That in a nutshell is the reason Prof. George L. Miller wrongly predicted the winner of the 1980 Miss America contest.

Miller, a Northern Illinois University professor of business systems and analysis, created as much of a stir as Miss America herself when he correctly predicted the 1979 winner based on computerized statistical analyses of past pageant winners [CW, Oct. 1, 1979].

This year, however, his prediction that Miss Kansas, Leann Folsom, would wear the crown [CW, Sept. 8], was far off the mark. Miss Kansas was not even selected as one of the 10 finalists.

What went wrong? "I really had very limited information," Miller explained. "I've never seen the contestants. I don't see them when I make the predictions, so I've never heard them speak, seen them perform and I don't know how poised they are.

"The reason I missed is that [I] had something that looked real good on paper and was likely to be a high winner based on what happened in the past," Miller explained. "But this year they had 10 excellent semifinalists and [Miss Kansas] really had a lot more competition than she would have had last year," he observed.

"It's not like it used to be. Here you have almost college graduates who have maybe 10 or 12 years of vocal training or something like that," he added, "and while they used to average 19 years of age, now they're very close to 22."

Furthermore, he noted, "I really didn't have any evaluation of [Miss Kansas'] talent, so when they had the talent and the swimsuit [competition] and she didn't score well in either one of those, that indicated that — even though she had the correct numerical statistics — others in the pageant may have had better musical arrangements or whatever."

Is it possible that Miller's prediction actually contributed to Miss Kansas' losing the contest? "According to the current Miss America, it didn't," Miller noted. "She was on the Today Show and she said she didn't see how it could influence judges in any way and I sort of feel that way."

While Miller's predictions may not have influenced the judges, his determination of "favored" talent categories and personal characteristics apparently has influenced contestants.

"Last year I announced that piano playing and singing was one of the better categories, and this year they ended up with four in that category," he noted. "Just like green eyes — I've been announcing that all along and they ended up with six green-eyed people in the final 10."

Although Miss Kansas and her followers may have suffered a great letdown as a result of the incorrect forecast, "I think she got a heck of a lot more publicity than the 39 other [aborans]. She got in *People* magazine, and so forth, so at least I got some publicity for her," he said.

Undaunted, Miller plans to again predict a winner next year "if I can get the information from the pageant people."

Prof. George L. Miller

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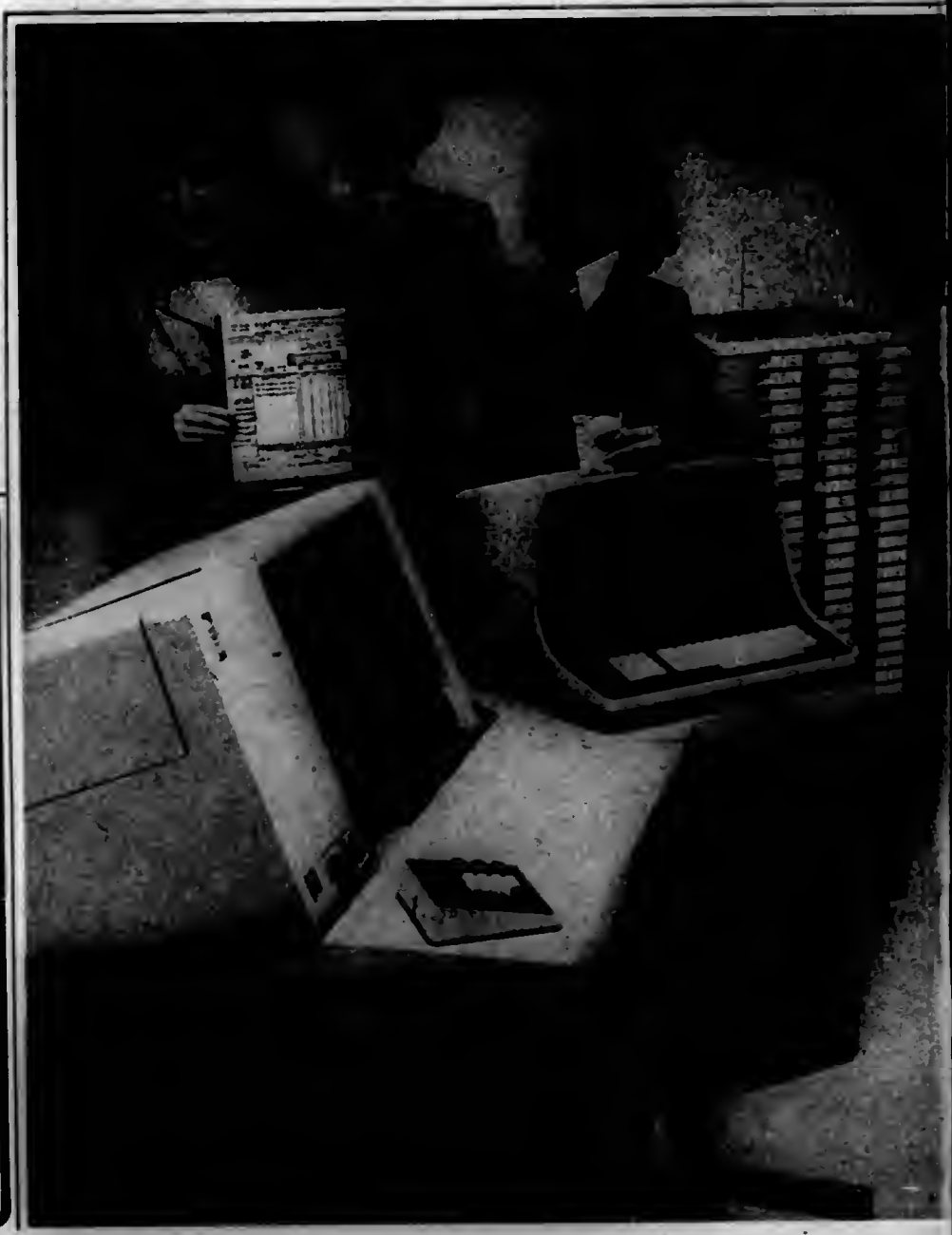

Threatening Telecom's Monopoly

IBM Venture Spawns SBS Clone Down Under

By Brad Schultz
CW Staff

SYDNEY, Australia — An IBM subsidiary and another 10 of Australia's largest corporations have moved to take control of this nation's long-range communications planning away from the federal government by forming their own version of Satellite Business Systems (SBS).

Called Business Telecommunications Services Pty. Ltd. (BTS), this joint venture will be headed by Peter Holmes A'Court, former external affairs director of IBM Australia Ltd. BTS will do much to prepare Australia for its first domestic communications satellite, informed sources predicted when news of the company's founding broke last week, in opposition to the federally run Telecom monopoly, which wants to keep data flowing through its telephone lines.

Telecom fills the same function as the postal, telegraph and telephone authorities of European countries. The giant corporation is often compared to AT&T because both organizations have entered the DP marketplace by drawing on vast revenues from strictly telephone operations.

Both in the U.S. and down under, computer vendors have called this cross-subsidizing unfair. The U.S. Federal Communications Commission (FCC) has agreed, ordering Bell to keep financing of its voice operations separate from financing of its DP side.

In Australia, foreign (including U.S.) and native computer vendors have pushed for similar restrictions on Telecom. But Australia has no FCC. As a government agency, Telecom has monopolized the nation's telecommunications with only nominal accountability to the federal Ministry of Post and Telecommunications.

So 11 major Australian firms have seized this look-alike Bell by the horns, forming its BTS to — in A'Court's words — "establish whether government and private enterprise can cooperate in the provision of [advanced telecommunications] services."

Joining IBM Australia, which transferred A'Court to the BTS top job, are Australia's largest or nearly largest firms in the oil, insurance, electronics, diversified manufacturing, publishing, broadcasting, retail, trucking and mining industries.

Those three organizations may prove to be the largest customers of their own joint venture, some observers have said, but SBS' main purpose will be competition with AT&T's terrestrial links, notwithstanding Bell's Ad-

(Continued on Page 12)

Heavy Hitters Sign With IBM

SYDNEY, Australia — In facing a combined challenge in data communications from 11 of Australia's largest companies, the Telecom monopoly's plight might be compared to what AT&T would face in the U.S. if similarly threatened by a consortium of IBM, Exxon Corp., Aetna Casualty and Life, Texas Instruments, Inc., Columbia Broadcasting Systems, Sears Roebuck and Co., United Airlines and a few other industrial giants.

Telecom, like the postal, telegraph and telephone authorities of Europe, was formed to ward off telecommunications domination from abroad and coordinate a nation's assimilation of telecommunications technology. Immensely profitable, Telecom depends on revenues from its considerable investment in telephone lines and resources.

Like Bell, Telecom has much to lose if its data communications customers decide to replace terrestrial links with independently supplied satellite facilities. The organization, a component of Australia's Ministry of Post and Telecommunications, must now reckon with the following shareholders of Business Telecommunications Service Pty. Ltd. (BTS) in the remote DP arena:

- IBM Australia Ltd., whose former external affairs director will manage BTS.
- CRA Ltd., Australia's second largest company, a mining giant partly owned in the UK.
- CSR Ltd., Australia's third largest company, also in mining.
- Ampol Petroleum Ltd., one of the largest Australian oil producers.
- The Myer Emporium Ltd., Australia's largest retail chain.
- Publishing and Broadcasting Ltd., a giant in both industries.
- Australian Mutual Provident Society, the largest Australian insurance company.
- Amalgamated Wireless Australasia Ltd., huge in diversified electronics.
- Thomas Nationwide Transport Ltd., big in trucking and a major domestic airlines.
- James Hardie Industries Ltd., a construction materials supplier.
- Australian Consolidated Industries, Ltd., a diversified manufacturer.

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Court Rules Western Union's LCR Illegal

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Western Union Telegraph Co.'s cut-rate overseas telex service, which costs the user up to 30% less than what U.S. international record carriers (IRC) charge, is on the verge of being terminated because a federal appeals court in New York City has ruled that the offering is illegal.

That decision came in a suite filed by three IRCs — Western Union International, Inc., ITT World Communications, Inc., and RCA Global Communications, Inc.

The service is still being offered, a Western Union spokesman said late last week, because the court's verdict directed the Federal Communications Commission (FCC) to issue a stop order which had not yet been received by the telegraph company. But the spokesman indicated that orders from new customers were no longer being accepted.

The FCC, meanwhile, has asked the New York appeals court for more time to prepare a request for reconsideration. That petition was pending at press time last week. If the petition is granted, Western Union's Low-Cost Routing (LCR) service would continue until the court completed its deliberation.

Launched last fall, LCR service provides connections to about 100 countries. Messages are handed off to CNCP Telecommunications, a Canadian carrier, and to Direccion de Telecommunicaciones, the Mexican telecommunications authority, for relay overseas.

At the moment, LCR provides one-way outbound transmission only, on an immediate delivery or store-and-forward basis. Before being shot down by the appeals court, however, Western Union had planned to establish a direct, two-way service with overseas carriers.

The court said basically that LCR violates Section 222 of the 1934 Communications Act because it involves international telegraph operations and the handling of overseas traffic. Under Section 222, as interpreted by the court, Western Union is barred from performing either function. Only Congress can lift these restrictions, the court indicated.

FCC Logic

Last year, when the FCC allowed Western Union to provide LCR, the commission pointed out that much of the international telex traffic originating within the U.S. is carried over Western Union facilities to the domestic switching centers of the U.S. IRCs. "In our view, land-line haul traffic handled by Western Union remains land-line haul traffic regardless of whether it is handed off to [a U.S.] IRC . . . or . . . to a Mexican or Canadian carrier."

However, the appeals court said that if this reasoning is accepted, "Western Union could defeat Congress' purpose, which was to protect the IRCs from abuse by Western Union of its domestic monopoly power . . . simply by teaming up with one or more foreign carriers . . . and bypassing the IRCs altogether."

Shortly after the court's ruling was announced, Robert M. Flanagan, Western Union's chief executive officer, pointed out that the FCC's main purpose in authorizing LCR last year was to promote competition in the international telex market.

"This expectation of effective competition was on the way to being realized. During the past year, international telex prices have been reduced dramatically — concurrently with Western Union's initiatives in the marketplace. If the court decision is allowed to stand, however, the users of international communications will be the real losers," Flanagan said.

However, the court's ruling applies only to Western Union, not to the resale carriers which the FCC authorized concurrently with its OK of LCR. They are also offering international telex service at rates significantly below those charged by the IRCs.

DPMA Conference Expects Success Despite Recession

PHILADELPHIA — "Despite the recession, the Data Processing Management Association (DPMA) anticipates its 29th international conference and business exposition to be one of the most successful ever presented," according to DPMA executive director Edward J. Palmer. The conference will be held in Philadelphia on Oct. 26-29.

The conference agenda includes preconference workshops, "early-riser" sessions, 50 seminars, and an optional tour of Atlantic City, N.J.

The annual conference highlight is the presentation of the DPMA Distinguished Information Sciences Award (formerly "DPMA Computer Sciences Man-of-the-Year"). This year's recipient of that award is John Diebold.

Additional information is available from DPMA International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

SBS Cloned Down Under

(Continued from Page 11)

vanced Communications Service, for the data communications dollars of U.S. users large enough to afford the roof-mounted dish antennae necessary for satellite traffic.

"The emergence of BTS shows the increasing significance of telecommunications to business as the much reported communications revolution gathers momentum," A'Court remarked. It may also indicate that IBM, through foreign subsidiaries, plans to wage war from outer space on the telecommunications monopolies or near-monopolies it finds in lucrative markets outside the U.S.

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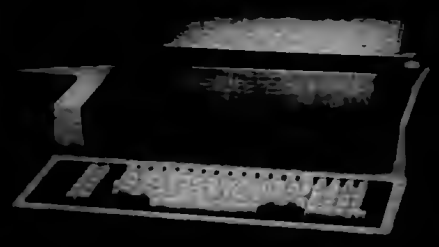

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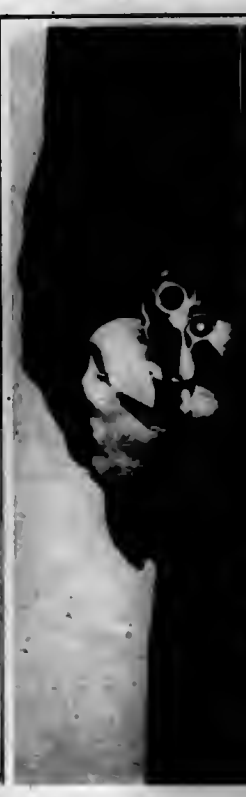

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Claims 10% May Go Unread

Fisa Denies New York Ignores 60% of Reports

By Rita Shaer
CW Staff

NEW YORK — Some reports generated by the city's Integrated Financial Management Systems (IFMS) may be going unread, but the number is closer to 10% than 60% claimed David Woodbridge, director of the information systems unit that produces these reports.

Woodbridge was responding to recently published audit results from the Office of the State Comptroller for New York. It stated that close to 60% of the 63 IFMS monthly reports and some two-thirds of the daily reports were essentially ignored by many of their users [CW, Aug. 25].

The Financial Information Services Agency (Fisa) might "produce more information than people can use" and didn't necessarily produce it in the best format for the city's line agencies, Woodbridge acknowledged. However, he took exception to the research methodology utilized by the comptroller auditors.

Audit Sample

The term "report" as used in the comptroller's audit actually referred to a report/agency combination, according to Fisa's official response.

Twenty-one different monthly reports were shown to personnel at various agencies for a total of 66 report/agency combinations, Fisa explained. Similarly, three of the 21 daily reports produced by IFMS were the sample given to five agencies to produce 15 report/agency combinations.

Therefore, the sample used by the auditors can be summarized as follows, Fisa noted:

- Personnel at eight of the 140 line agencies (about 6%) were contacted regarding approximately 11% of the total number of reports sent to line agencies (15 out of 131).
- Personnel at the two central agencies included in the audit — comptroller's office and Office of Management and Budget — were contacted regarding six (9.5%) of the 63 monthly reports sent to the central agencies.
- Personnel at five line agencies (3.5% of the total) were asked about their use of approximately 14% (three out of 21) daily reports.

The comptroller's representatives "only looked at the trees" in the forest of IFMS, Woodbridge said, "and then [the auditors] misdefined the forest."

Primary Goal

The agency maintained that its primary goal is to maintain auditable financial records to provide financial statements in accordance with generally accepted accounting principles (Gaap).

IFMS has, in fact, met this goal since the city's books have been certified as auditable for 1978 and 1979 — the two years that IFMS has maintained the financial records. The audit for fiscal 1980 is currently in progress and "there are no known problems," Woodbridge said.

The provision of financial and budget information required for line agency managers to operate their areas is a secondary goal, Fisa noted. The first goal has been accomplished, the agency said, and it is now working on ways to help city agencies make use of the detailed information available from IFMS.

Fisa also pointed out that all of the figures contained in the audit report were generated more than a year ago — around April 1979 — although the report was not formally released until last Aug. 4.

In the meantime, Fisa implemented an improved Reports Distribution System (RDS) in December 1979. The RDS was based upon a questionnaire survey conducted with the Urban Academy, visits to major city agencies to discuss individual needs, memo notification to all agencies to review the proposed reduced report packages and user meetings in November 1979 to which all city agencies were invited, Fisa said.

The result of the RDS has been "a significant decrease in output" for 46 small agencies and a 5% increase in output for 31 large agencies, according to Fisa.

In addition, three of the 63 monthly reports sent to central agencies have been eliminated and four other reports have either been eliminated or replaced since early 1979, Fisa noted.

Comments about the daily IFMS reports also indicated a lack of understanding with a corresponding need for training at the line agency level, Fisa said. The agency also claimed that the perception among some IFMS users that certain monthly reports were received too late to be helpful could be traceable to late internal distribution.

In response to the audit's recommendations for remedial action, Fisa stated that it is currently reviewing usage of daily reports with plans to eliminate three reports and consolidate another.

The agency also canvassed the 11 or 12 large agencies that manage "approximately 90% of the city's budget" and a "good sampling of the smaller agencies" regarding usefulness of Monthly Encumbrance Reports which should result in additional report consolidation.

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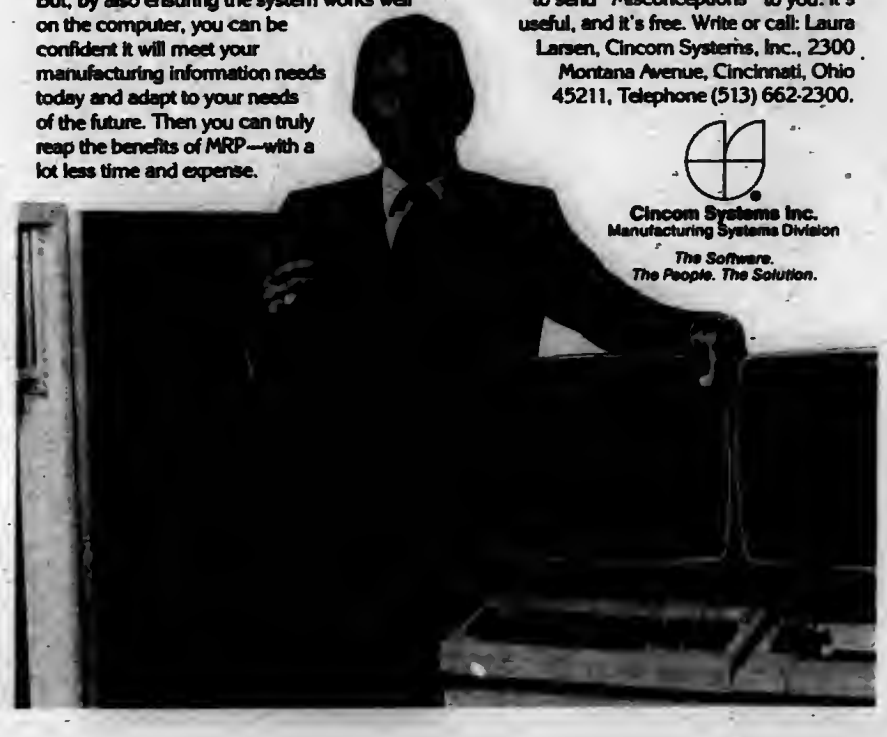

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Fax Service in Wings

Ecom Slated to Begin January 1982

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The controversial Electronic Computer-Originated Mail (Ecom) service proposed by the U.S. Postal Service (USPS) two years ago will begin commercial operation in January 1982 — and possibly sooner, Postmaster General William F. Bolger said here last week. Another new electronic messger offering — an international facsimile service called Intelpost — will be established "before very long" between the U.S. and Canada, he added.

Speaking to the National Postal Forum — a conclave of postal officials, users and suppliers — the Postmaster General also said the agency's Express Mail service would be expanded; a proposed change in the private express statutes, opposed by the computer industry, will be abandoned, users of the new nine-digit Zip Code will qualify for reduced postal rates, and accounting requirements for metered mail users will be simplified.

Separate Subsidiary

The first step toward implementing Ecom will consist of forming a separate subsidiary. It will "oversee" not only that offering but also all of the agency's other electronic projects — presumably including Intelpost and the Electronic Message Service System (EMSS), a still-nascent plan to transmit regular first-class mail on-line among post offices throughout the nation.

Startup of Ecom was recently approved by the USPS board of governors, which directed the agency to develop interface standards cooperatively with private vendors of electronic mail and message services. In his Postal Forum speech, Bolger said "we will move forward rapidly" to establish the standards. He has asked Henry Geller, the President's chief telecommunications adviser "to give us the benefit of his assistance."

Negotiations have already begun with Canada to establish Intelpost service, Bolger added. This offering will employ domestic circuits to get messages to the border "and thus would be acceptable under applicable communications law. Upon completion of an arrangement with Canada, we would . . . commence negotiations aimed at establishing Intelpost between the United States and Western Europe by transmitting . . . through Canada."

Private Express Charges

Bolger also reported that USPS will shortly promulgate a number of changes in the private express statutes. One proposed change, involving a new definition of telegrams, has been dropped, he said. "This proposal was wrongly interpreted by many as an attempt by the Postal Service to bring new forms of electronic transmission under the protective umbrella of the statutes. We have denied this repeatedly."

Express mail service is being expanded to include every three-digit Zip area, which will add "over 3,000 pickup stations," the Postmaster General reported.

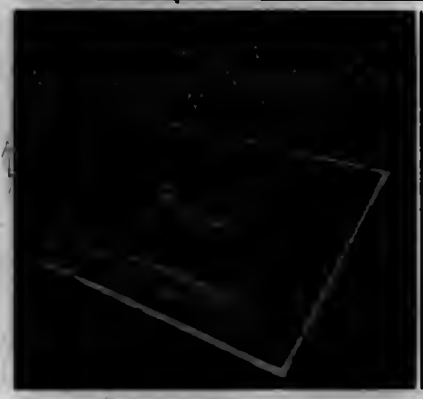
Regarding metered mail, Bolger said users of this service from now on "will no longer be required to keep a daily record of their meter use. With the advances that have been made in meter-setting technology, this requirement becomes an unnecessary nuisance and we are doing away with it."

Nine-Digit Zip May Lower Rates

WASHINGTON, D.C. — Users of the new nine-digit Zip Code will qualify for reduced postal rates, Postmaster General William F. Bolger said here last week.

The expanded Zip Code, Bolger said, "promises to reduce both our costs and our error rate and thus is not only in our interest, but in the interest of every user of the mails."

There has been widespread criticism of the nine-digit Zip by computer users, who contend it will require massive and expensive reprogramming. Apparently mindful of these added costs, Bolger said the U.S. Postal Service will share the benefits of the expanded Zip Code.



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World Teleconference Extends Boston's Great Cities Meet

By Connie Winkler
CW Staff

CAMBRIDGE, Mass. — The Great Cities of the World Conference marking Boston's 350th anniversary will be heard around the world because of a teleconference planned by Future Shack.

"We are augmenting the physical gathering here in Boston with teleconferencing," according to Frank Catanzaro, vice-president of Future Shack and executive producer of the Great Cities teleconferencing project.

Several terminals will be publicly available in Sweden and Toronto — in Sweden at public libraries, for instance. By the time Boston's Great Cities conference begins Sept. 22, there will also be a terminal in Jerusalem.

U.S. locations include Los Angeles — now going into its 200th year — Kansas City and Boston.

These locations will receive reports from the Boston proceedings, which will focus on the prospects and problems of large cities, and communicate with other cities. Catanzaro sees this as the beginning of a city-to-city network — which would remain in place after the Boston session — and an innovative aproach to international relations.

The cities' teleconference will use the Electronic Information Exchange System developed through the New Jersey Institute of Technology which is linked into Telenet.

The nonprofit project will cost about $50,000, with most donations coming from in-kind contributions of equipment manufacturers and corporations, Catanzaro said.

Future Shack is a Cambridge-based consulting group which integrates multimedia and computers to, as Catanzaro explains, "demystify computer technology."

CFI to Provide IBM, Amdahl Residual Values

By Connie Winkler
CW Staff

NEW YORK — Computer Financial, Inc., (CFI) has jumped into the business of predicting residual values of IBM and Amdahl Corp. computers. The residual information will be available in reports and newsletters from CFI's new affiliate, CFI Publications, Inc.

CFI is enlarging its initial business of providing residual value projections on IBM computer equipment to banks, financial institutions and third-party lessors since 1971, Tom C. Martin, CFI president, said at the CFI Publications announcement recently.

CFI's competitors include The Gartner Group — which in July announced the Residual Asset Value Estimation (Rave) package — and International Data Corp.

Unique Service

CFI provides information on both Amdahl and IBM mainframes and IBM disks, tapes and printers. "Unique among the services offered today by both major consulting firms and small specialists in the field, CFI's program permits subscribers to select reports germane to their needs," Martin said.

To make its projections, CFI uses a data base that dates back to 1971. Both the firm's principles are former IBM employees.

The reports are listed according to product and range in price from $100 to $900. It is necessary to buy several reports to appraise the precise configuration. There is also a $440 annual membership fee.

The need for residual value information is becoming increasingly important for users as they evaluate the increasing number of computer systems options. Martin told of one user who is leasing an IBM 168 for $89,000 a month, when the same 168 model can currently be had on the used market for $20,000 a month.

CFI Publications is at One University Plaza, Hackensack, N.J. 07601.

Colorado Rewrites Tax Rule To End Canned Software Tax

By Marguerite Zientara
CW Staff

DENVER — Following the lead of the dozen states that have granted sales tax exemption status to computer software packages — and without pressure from the DP industry — Colorado has rewritten its tax rule to tax only system control software.

Currently before the state attorney general awaiting an official opinion, the new rule is "very valid" and will probably be approved, according to Joseph Macias, tax supervisor for the sales tax department of the Colorado Department of Revenue.

Expected to become effective "around Nov. 1" if approved, the rule would end taxation of canned software, which began in July 1977.

"What we've decided is that, in the operation of computers, there is really no such thing as a canned program," Macias said. "Everything becomes a custom program, in that even for a normal canned program, somebody still has to study your needs."

Even if Colorado stops taxing the sale of software come November, however, the City of Denver may continue to do so. As one of 29 Home Rule cities in the state, Denver administers and collects its own sales taxes, Macias explained.

If Colorado exempts the tax and Denver maintains it, problems could arise, Macias said. "Someone that's operating in Denver would have to know they have to [pay] the Denver tax and not the State of Colorado tax."

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10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
80 Business Service (except DP)
85 Education/Medicine/Law
90 Government - Federal/State/Local
95 Printing/Publishing/Other Communication Service
99 Other _____

TITLE OCCUPATION/FUNCTION

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
53 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other _____

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Detach here, fold, and place in post-paid envelope attached through binding.

L.A. DPer Strike Threat May Be Averted as Unions Approach Wage Settlement

By Jeffry Beiler
CW West Coast Bureau

LOS ANGELES — Local authorities appear to have averted, at least for the time being, a prolonged and possibly crippling strike involving the bulk of the city government's computing staff.

Starting in mid-July, many of the city's approximately 200 programmers, analysts and other computing personnel threatened to walk off their jobs for two weeks or more unless local officials OK'd their demands for an immediate 10.5% pay hike.

Now, however, the workers' wage dispute with the city appears to be nearing a settlement, and the danger of an extended computing-staff walkout seems to be subsiding, a local source said.

Word that city officials and computing personnel are apparently resolving their differences has been greeted here with a sigh of relief.

If the would-be strikers had made good on their threat to stage a two-week walkout, many of the community's most vital public services would almost certainly have been severely disrupted, despite the best efforts of computing-department supervisors to keep the programs running.

Especially hard hit would have been key on-line applications such as the city's fire and police information systems.

City officials got their first bitter taste of a computing-staff strike in July when almost all the community's 150 programmers, systems analysts and operations personnel left their jobs for three days to press their demands for higher pay [CW, July 28]. The strike — the first involving computing staffers in the city's history — proved only a relatively minor inconvenience for area residents, primarily because of its brevity.

But no sooner had the work stoppage ended than disgruntled employees began threatening to stage a second, much more prolonged walkout.

For a while, prospects for averting a follow-on strike looked dim, but then came a development that suddenly and dramatically altered the picture. Late last month, a widely publicized walkout involving another group of city employees — the water and electrical-power workers — ended abruptly with an agreement that granted the strikers a pay raise of somewhere between 9% and 18%.

De Facto Standard

The agreement, which represented a compromise of the two sides' bargaining positions, in effect set a de facto standard for other groups of dissatisfied city employees, including the municipal computing workers, to follow.

Since then, efforts to resolve the computing staffers' continuing wage gripes have apparently gone smoothly. The city's approximately 50 keypunch operators, who are represented by a local clerical union, have already received tentative approval for a 15% pay hike that includes an initial 10% raise with an additional 5% equity adjustment, the source said.

A similar agreement has recently been forged by the union representing the city's computing-department supervisors.

The only computing workers for whom the outcome of wage negotiations is still uncertain are the city's programmers and operations personnel, who are represented by a union named the Engineers and Architects Associations. But even for those employees, the prospects for a new labor contract and higher pay look bright, the source said.

Deadline Moved For NCC Papers

CHICAGO — The deadline for papers and presentations has been extended for the 1981 National Computer Conference (NCC), to be held here May 4-7. General papers can be submitted until Oct. 27, and the last day to propose topics for the technical panel sessions is Oct. 1. Also, the personal computing festival program, which focuses on hobby and small business applications, will accept papers until Feb. 1, 1981.

With the theme "Keys to Productivity," the convention, chaired by Albert Hawkes of Sargent & Lundy Engineers, will feature approximately 100 technical sessions and 190,000 square feet of exhibitions. This is the 30th anniversary conference, which also coincides with Univac I's 30th birthday, to be commemorated on "Pioneer Day" at the conference.

The five major subject areas to be handled at the conference were set by the steering committee as hardware, software, information process management, applications and social and economic implications. According to program chairman Alex Orden of the University of Chicago, 1981 NCC looks to be the largest computer conference of its kind.

It will all be happening at McCormick Place.

More information is available from AFIPS/NCC '81, P.O. Box 9658, 1815 North Lynn St., Arlington, Va. 22209.

Microfilm Legality Codified by Study

CHICAGO — "Legality of Microfilm" is a research study on the admissibility and acceptance of microfilm records in the court system, according to its publishers, Cohasset Associates, Inc. Identifying and analyzing all laws and regulations pertaining to microfilm, this publication reprints more than 750 laws, rules of evidence and interpretations.

The 556-page document also features a "how-to" micrographics section that details the implementation process of a microfilm system that will satisfy 32 key provisos upon which the legal acceptance of microfilm may be contingent.

It is available for $100 (plus $25 per update) from Cohasset Associates, Inc., 3806 Lake Shore Drive, Chicago, Ill. 60601

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There's a new name in the software products market.
It is called Insac Software Inc.

Earlier this year, Altergo Software was acquired by the INSAC Group and to reflect that change we have become INSAC Software. In the three years since we began selling systems software products, we have met our initial objectives. We operate seven fully-staffed regional sales and service offices and have installed products at more than 400 computer sites in the U.S. and Canada. We sell a range of systems software products with two of them, SHADOW II and SYSTEM/MANAGER, elected to the Datapro Software Honor Roll in each year since their market introduction.

As INSAC Software, we are now in the position to offer users a number of advantages:

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Survey Finds DDP Users Lack Recovery Plans

By Tom Henkel
CW Staff

ELLICOTT CITY, Md. — Almost half the DPers who responded to a recent survey on distributed data processing (DDP) systems admitted their firms currently do not have disaster plans.

Fifty-two percent of those polled by Impact Marketing Services, Inc. here said they had a disaster recovery plan; 47% said they did not. Of those without a plan, 34% indicated a plan was in the works, while 13% said their firms had no immediate plans to develop a recovery plan. One respondant to the survey didn't know if he had a recovery plan, according to Impact Marketing Services, Inc., which conducted the survey.

Broken down according to types of industry, manufacturers tend to be the best equipped to handle a computer disaster with 14 of 18 firms in that category indicating there was a disaster plan. Although not as well prepared as manufacturers, insurance firms also tend to be well set for a disaster. Nine of 17 firms in that group said there was a disaster plan. The majority of wholesalers, retailers, financial services and transportation firms, however, said no plan exists.

The education field, which had only two respondents in the survey, is an unusual case. One DPer polled said his firm had a disaster recovery plan, while the other DPer didn't know if a recovery plan existed, the report said.

Favorite Answer

Asked whether a DDP environment would enhance a firm's ability to recover from a disaster, the pollster came up with a definite "maybe."

Twenty-two percent of those polled said DDP would "absolutely" enhance recovery. Twenty-six percent were less optimistic but said the firm would probably be better off in a DDP environment.

On the other hand, 29% of those polled said DDP probably wouldn't hurt recovery, while 13% said it would probably complicate things even more, the report noted.

Manufacturing firms, wholesalers, retailers and transportation firms tended to feel DDP would enhance recovery while financial services, insurance firms and the catch all "other" grouping said DDP would not be a benefit, the report noted.

Smaller DP shops tended to be more concerned about recovery in a DDP environment. Firms with 24 or more remote sites generally felt comfortable (64%) about recovery in a DDP environment, according to the report.

The full report, priced at $550, is available fom Impact Marketing Services, Inc., 10318 Globe Court, Elliott City, Md. 21043.

What Effect on Security?

ELLICOTT CITY, Md. — The opportunities for computer fraud don't increase when a firm switches to a distributed data processing (DDP) network, according to 92 DPers responding to a recent Impact Marketing Services, Inc. survey.

Of those polled, 47 said a switch to distributed processing doesn't make a difference in system security. However, better than a quarter of those questioned (29%) said they were unsure of what effect the DDP switch would have on security.

Eight percent said DDP leaves the door wide open to computer fraud, while 1% said it closes the door on fraud. Four percent of those polled said they didn't care about the possibility of computer fraud, and 11% answered in the "other" category.

The survey was conducted from January through May of this year.

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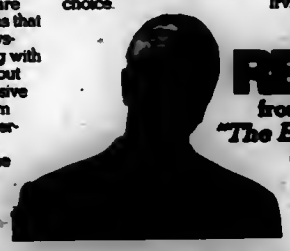
Microdata Corporation, P.O. Box 19501, Irvine, CA 92713.



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Interchange Sets October Meet

TINTON FALLS, N.J. — Interchange, the user group of the Perkin-Elmer Corp.'s Computer Systems Division, will hold a general meeting here on Oct. 6-7. Called "Interchange '80," the meeting will be comprised of discussion between Perkin-Elmer top management and Interchange members, technical papers, workshops and special interest group meetings.

User-developed software and hardware and Perkin-Elmer's newest products will be demonstrated.

More information is available from the firm at 2 Crescent Place, Oceanport, N.J. 07757.

NCCMG to Hold Fall Meeting Sept. 30

SAN FRANCISCO — The Northern California Computer Measurement Group (NCCMG), a recently established division of the national CMG, will hold its fall meeting here Sept. 30.

Newcomers to the industry as well as parties interested in computer performance evaluation are invited to attend.

Preregistration is $15; registration costs $18. Further details are available from Standard Oil of California, Room 3826, 525 Market St., San Francisco, Calif. 94105.

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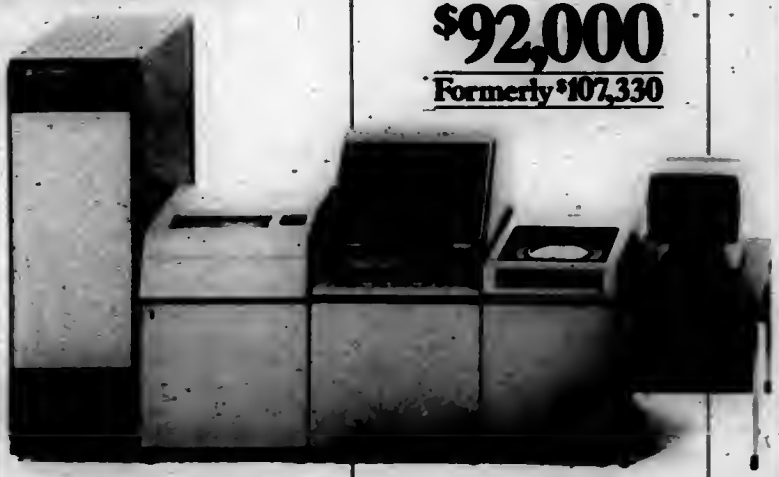

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4708HPO86

Supermini 'Service Bureau'

Weyerhaeuser's Applied Math Center has 10 printing and CRT terminals for use by researchers.

Special to CW

FEDERAL WAY, Wash. — Weyerhaeuser Co. here has installed an internal superminicomputer time-sharing "service bureau" to aid researchers in evaluating everything from sophisticated process control algorithms to baby diapers.

The supermini has exhibited less than one-year return on an investment of $350,000, including operating and amortized facility costs.

Weyerhaeuser is a $4.4 billion manufacturer of lumber, fiber board, plywood and finished wood products as well as a presence in the pulp, paper and container industry. It owns nearly six million acres of tree land and harvest rights in the U.S., Canada, Malaysia and Indonesia.

Allied interests include real estate, agriculture, salmon ranching and shrimp growing. It also is the largest private-label supplier of baby diapers to chain stores.

Research Staff

To support these varied interests, Weyerhaeuser maintains a 1,000-person research and development staff in a 260,000-square-foot Technology Center near headquarters here.

Prior to 1979, the researchers used either an internal service bureau based on a Honeywell, Inc. mainframe or outside time-sharing services.

"The internal bureaus lacked on-line modeling and statistical capability," recalled Dr. Paul DuBose, manager of the Applied Math Center, "while outside services with these facilities were quite expensive. We had been analyzing this problem for some time and began evaluating minicomputers, including superminis.

"One very attractive system was the Digital Equipment Corp. VAX-11/780, which combined the 32-bit-word addressing range needed for complex modeling with a broad number of available statistical analysis packages.

"It also had interactive capability and compatibility with the PDP-11 equipment used by our process control people," he added.

The VAX-11/780 was installed in August 1979. It has 1.5M bytes of main memory with two 67M-byte RM03 disk drives and two 176M-byte RP06 disk drives. Peripherals include a TE16 tape, two high-speed printers and an X-Y plotter/-printer.

There are 32 communications ports: 14 dial-up and 18 direct lines to various users. The 170 users employ about 90 Decwriter-II and III printing terminals along with VT100 and other CRT terminals. Most of these terminals are also used on other Weyerhaeuser computers.

About 60 users log on the VAX during each business day, with 20 to 30 on the computer at any one time.

Interactive Research

"The primary purpose of the Technology Center is to examine new technological concepts, evaluate them and ultimately test them in operational facilities," DuBose noted. "The applications are developed on-line to the VAX-11/780 and, when proven feasible, the concepts are transferred to appropriate divisions for implementation."

The process control group has several PDP-11/34s along with a variety of specialized data acquisition equipment and proprietary interfaces.

The group acquires test data on the PDP-11s, then transfers it to the VAX, via Decnet,

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If you're an existing InterTube user, you no doubt have discovered the exceptional value the InterTube really is. And, if you're not, why not call or write us today for the name and address of your nearest InterTube III dealer. Intertec video terminals are distributed worldwide and may be available in your area now.

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Bolsters In-House Research

for further modeling and statistical analysis. Control algorithms are also developed on the VAX for down loading to the PDP-11s.

"All of the process control programs involve large data storage and number-crunching operations, many using graphic analysis programs," DuBose observed.

Some of the new concepts involve techniques for computer-controlled sawmills. Researchers are working on systems that recover maximum value from each log cut in the mill.

They develop models on the VAX-11/780 and synthesize various conditions, then compare economic factors against various schemes to adjust algorithms and associated memory requirements to levels suitable for minicomputers.

The programs are then tested in plants which may be on-line to the VAX-11/780.

Environmental Programs

One program under in-plant study is a waste-water treatment process which employs a series of tanks and containment basins. At various stages, chemicals are added to breakdown effluents, settle the sludge, and then the water is aerated before it is released.

Once a day, a plant operator logs on the VAX-11/780, which then prompts him to enter 30 to 40 specific process parameters. These include acidity, biochemical-oxygen demand suspended particulates, dissolved oxygen, temperatures, tank and pond levels, flows, equipment in operation, type of pulp being processed and other process variables.

The VAX-11/780 then compares entered data against computer-resident models and previously entered data to calculate proper control settings. Some processes, particularly biochemical ones, are quite slow so the once-a-day period is sufficient for plant operations.

The VAX-11/780 also prepares management reports that document the treatment conditions daily and monthly.

"The strength of the pilot program is that it lets people who are knowledgeable in energy conservation and effluent treatment aid the operators in plants," according to Dick Zimmerman, programmer analyst. "The programs also acquaint plant personnel with the computer equipment and prompting concepts.

"It also allows research and development people a great latitude in equipment selection. Many times what we think we need at the project's start is quite different than the final configuration.

With the VAX-11/780, we can develop the programs, debug them and try them under actual plant-operating conditions prior to investing in computer hardware."

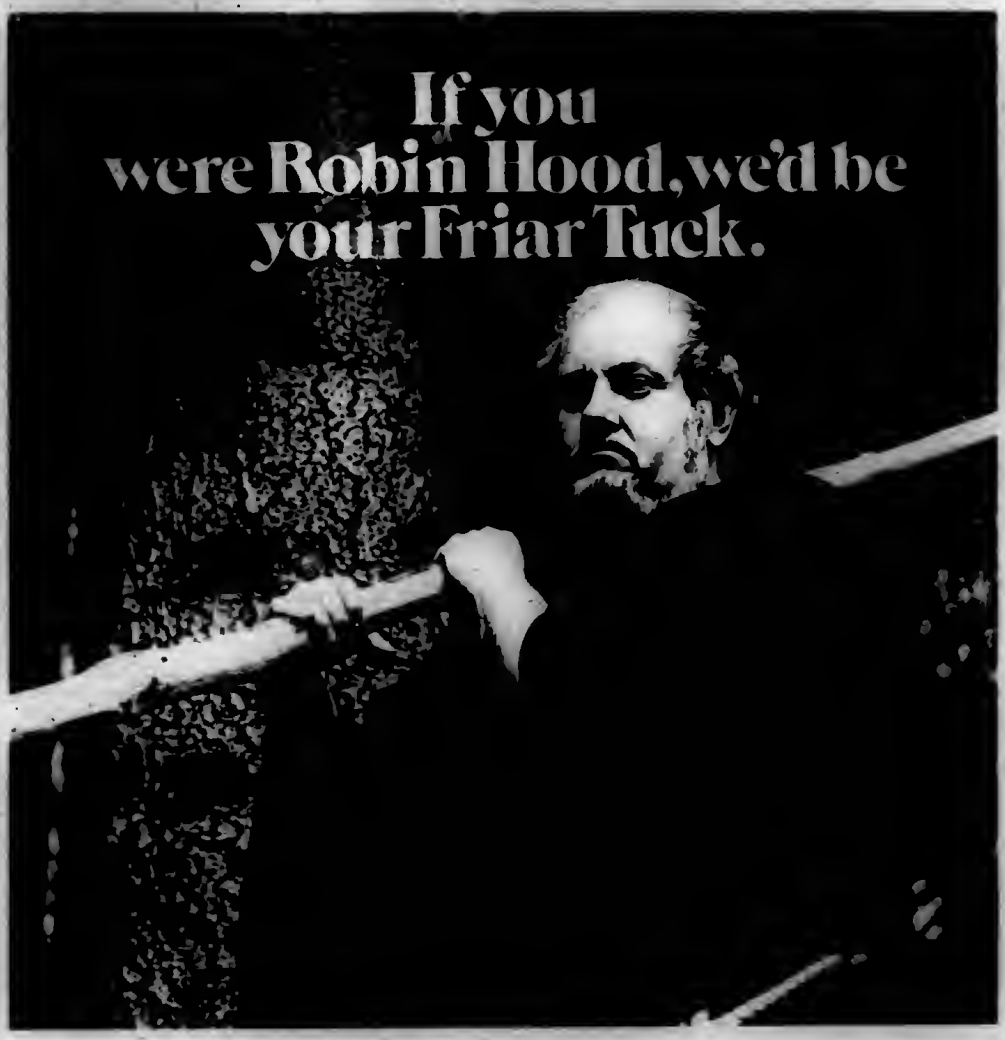
A similar pilot project involves maintenance programs at another Weyerhaeuser plant. Resident in the VAX-11/780 data base are all the records that are normally kept on paper.

Using a dial-up CRT terminal, maintenance personnel select listings from a main menu. These include process-control loops, available personnel, equipment by area and by type, spares, cross references and lubrication schedules.

Further submenus let plant personnel select specific records needed to perform the necessary work. As service or maintenance is performed and spares installed, the workers can immediately update the

(Continued on Page 22)

Weyerhaeuser researcher Susan Kimbal enters responses to baby diaper questionnaires (foreground).



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Intelcom Sets Meet

LOS ANGELES — "Competition in the Information Economy" is the theme of the upcoming International Telecommunication and Computer Conference and Exposition (Intelcom), which will convene here Nov. 10-13. Organized by Horizon House International, the event will bring together information processing and telecommunication technologies under the same roof.

Participants in the conference will include senior policymakers and technical experts from government, industry and commerce. The theme of competition will be presented in a three-tiered program: executive forums, technical sessions and applications panels.

Admission to the exhibit is $15 and, to the conference program, $200. More details are available from Janet Schotta, Media Relations, Horizon House International, 610 Washington St., Dedham, Mass. 02026.

Supermini Aids In-House Researchers

(Continued from Page 21)

files on-line. With paper records, this task is often overlooked, resulting in inadequate documentation.

Keeping Tabs on Time

With such a large research and development organization, Weyerhaeuser has a special 100-person group that provides testing and laboratory analysis services for other scientists in the Technology Center and for the company as a whole.

"The Scientific Services Group devotes about 200,000 hours per year to various projects," according to Bill O'Meara, programmer analyst, "and our salaries and equipment costs must be attributed to the appropriate project. We have about 1,000 active service requests each month, with around 100 added and completed during a 30-day period."

The Scientific Services Group uses the VAX-11/780 to monitor service requests, keep records, prepare reports and enter data into the corporate accounting system.

When a group needs testing or laboratory analysis, an operator runs a "program creator" routine which validates the request number and prevents duplication of jobs. The routine also prepares a work order describing the tests or procedures required.

At any time, various files and records may be viewed on the terminals or printed as reports. These include listings of all active work orders, the charges associated with each, summaries by activity and hours worked by employee name.

Reports are prepared using DEC's query language, Datatrieve, which speeds selection and sorting of the numerous files.

As the work is accomplished, each employer records the time required on a daily time sheet, which is entered into VAX files.

When the job is completed, appropriate files are dumped to tape for transfer to the corporate computer for billing.

"When we got the on-line system running, we found that we were able to more accurately attribute costs. As a result, we were able to reduce charges to our laboratory service users," O'Meara said.

Baby Diapers, Too

Technology Center personnel are also involved in new product development and use the supermini for a number of diverse applications. "One is a consumer evaluation of baby diapers," DuBose smiled.

"Questionnaires are enclosed in diaper packages which request information from the customers. These might ask about absorbency, moisture retention, strength and other factors."

The data from the returned cards are entered into the VAX for statistical analysis, and the results used to develop new products.

Because of the diverse user requirements, the Weyerhaeuser VAX-11/780 has an extensive software complement such as Basic Plus 2, Datatrieve, Fortran IV+, Macro and VAX-11 Pascal.

Other installed software includes the Biomedical Computer Products Statistical Analysis Programs, IMSL Library of Fortran math and statistical programs, Penn State University's Minitab Statistical Programs, Tektronix Easygraphing and Plot-10, Omsi Pascal and Runoff.

"We are planning to incorporate Interactive Systems' 'enhanced' Unix, Relational Systems, Inc.'s Oracle data base language and IBM 2780/3780 to transfer data to and from the Honeywell, Inc. computer," DuBose said.

AMA 'Limited Membership' Planned for Small Firms

NEW YORK — The American Management Associations (AMA) has issued a "Limited Company Membership" plan that enables smaller organizations to belong to the organization.

Among potential beneficiaries of this new opportunity, the AMA cited community hospitals, local school districts, hotels, accounting and architectural firms and real estate companies.

Limited Company Membership is for companies with an annual budget of $15 million or less or fewer than 250 employees. Membership allows three company officials to become AMA members.

They will receive a number of membership publications throughout the year that focus on the concerns of smaller organizations, including the 190-page annual report, "Compensation Policies and Practices for the Smaller Organization."

All employees become eligible for membership rates (10% to 15% discounts) on the more than 3,000 AMA yearly seminars.

Further details on AMA Limited Membership are available from the Director of Membership, AMA, 135 W. 50 St., New York, N.Y. 10060.

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- Provide answers to management and end-users on response time for their specific systems
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The CICS Response Time Analyzer is an optional add-on to the OMEGAMON/CICS software monitor. Response can be monitored in real-time in two ways: time slots (for example, 8 AM-10 AM, 1 PM-3:30 PM) and time intervals (such as the last 15 min, 30 min, 60 min).

Candle Corporation also announces:
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- **DEXAN** – The MVS Degradation Analyzer

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8:30 to 12 noon
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Cost (each course) $75/person, 3 or more: $65/person
Late registration at the door: $95/person
Lunch: Included Afternoon Session: Free
Afternoon: New Techniques for Monitoring CICS and MVS.

City	Place	Date
Detroit	Detroit Plaza	Sept. 22-23
Chicago	Ascot Hotel	Sept. 25-26
San Francisco	Hyatt Regency	Sept. 29-30
Atlanta	Hyatt Regency	Sept. 29-30
Washington, D.C.	Marriott Key Bridge	Oct. 1-2
Los Angeles	Marriott—LAX	Oct. 2-3
New York	Barbizon Plaza	Oct. 6-7
Boston	Parker House	Oct. 8-9
Dallas	Dallas Hilton	Oct. 13-14
Houston	Hyatt Regency	Oct. 15-16

For more information call the seminar hotline at (213) 823-9224.

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Health Service Network Cuts Red Tape and Attracts U.S. Government Attention

SANTA FE, N.M. — All too often humanitarian projects deserving of governmental funds go wanting because project administrators find themselves ill-equipped to deal with the bureaucratic red tape associated with such funding. Not so, however, with Presbyterian Medical Services (PMS), a rural health care company headquartered here.

In this case, in fact, the project administrators have proved so adept at handling the myriad details required by the U.S. Department of Health, Education and Welfare that the government agency has asked for advice in terms of the PMS information system for its own recordkeeping use.

PMS is a nonprofit, community-based corporation formed in 1965 to provide primary health care services, both medical and dental, to a widely scattered, isolated population in New Mexico. It has built a substantial health care network consisting of a hierarchy of hospitals, diagnostic and treatment centers and health stations.

PMS hospitals provide all of the services associated with such institutions, including complete laboratory and X-ray facilities. The diagnostic and treatment centers administer to the needs of ambulatory care patients, with an emphasis on preventive medicine. These centers also provide dental, laboratory, X-ray and pharmaceutical services.

Home health care and health education programs (including paramedical training for residents of the area), which are an important part of the PMS program, are handled by the centers as well. Providing backup for the full-time physicians, who man the health centers, are health stations supervised by nurse practitioners or physician assistants. Serving tiny settlements in remote areas, some of the health centers have no telephone and must communicate by radio.

Federal Funds

Many of the PMS clinics and programs are funded in part by the federal government. According to Dan Smith, PMS president, "Federal aid is absolutely crucial to the project." This is why since 1968, when it was awarded one of the first Neighborhood Health Center grants, PMS has been heavily involved in implementing methods to meet federal reporting requirements.

Sam Gray, director of PMS' management information services (MIS) department, attributed the success of the PMS system to its data base approach. "From the information in our Automated Patient Data System we were able easily to generate a set of programs for the Bureau of Community Health Services Common Reporting Requirements (BCRR), which includes tables on operating statistics, personnel, and financial information," he said.

"In fact, our department proved itself when the BCCR was introduced. Our data base already contained the information required for the report, and all the data processing staff had to do was to create the necessary output programs.

"No management time was consumed, no procedures were changed, no forms were modified. When you're used to operating widely dispersed rural clinics, you really have to utilize all your resources to the utmost, and that includes data processing," Gray added.

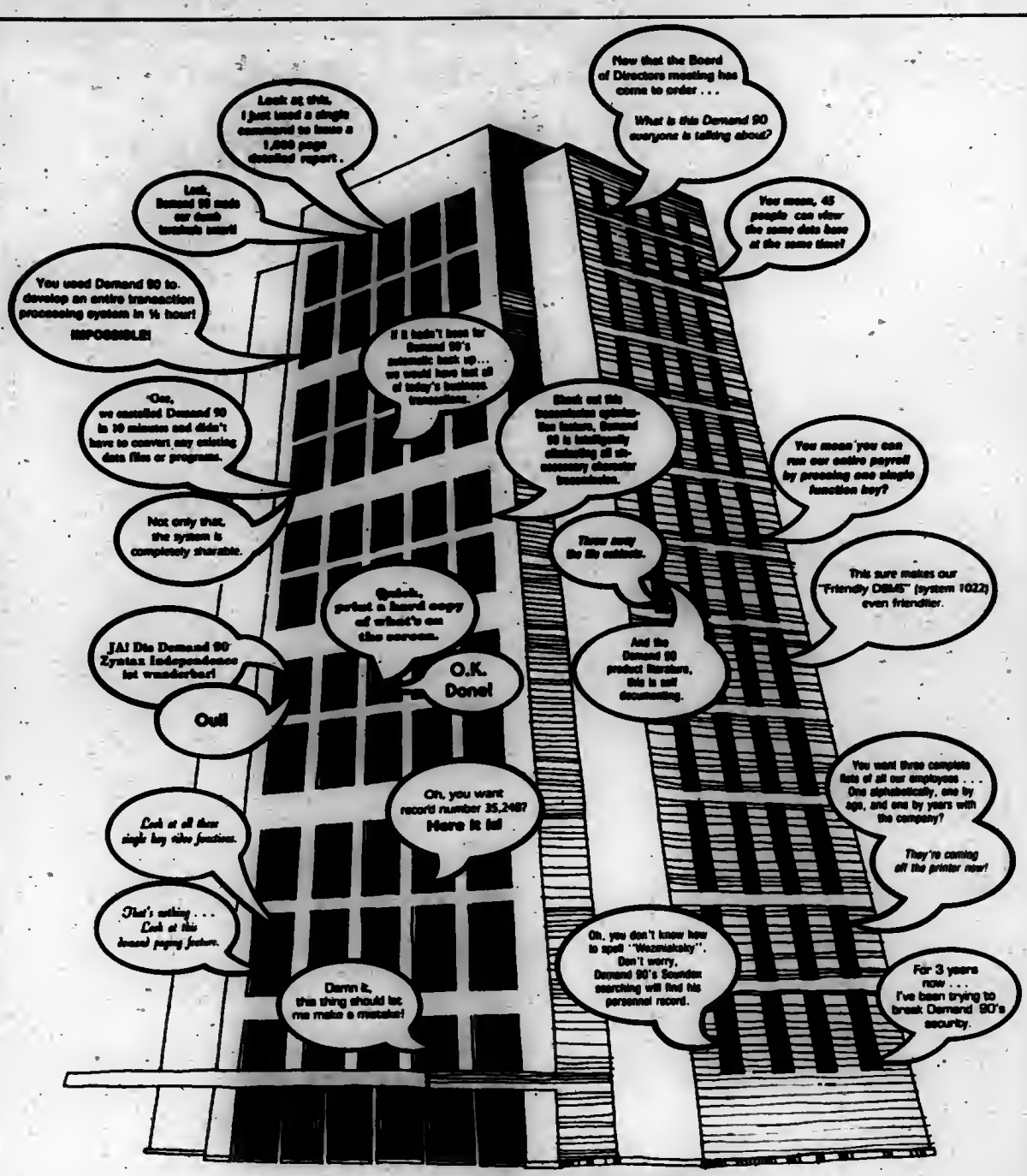
Forms MIS Department

Back at the time of that first grant in 1968, PMS contracted for its information services needs with DP companies and service bureaus. "The major disadvantage to this," Smith recalled, "is that we were dealing with firms whose primary interest was in computer science rather than health care delivery, which of course is our major concern."

After several years with the batch service bureau, PMS decided to operate its own MIS department and lease time on another company's computer. Through terminals in the PMS office linked to the time-sharing computer via leased telephone lines, PMS was able to do data entry and report preparation. During this period, PMS began

(Continued on Page 26)

A PMS employee enters health service data on one of the BTI terminals.



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Symposium Set For Managers

PALO ALTO, Calif. — The American Electronics Association (AEA) will hold a Human Resources Symposium in San Diego on Nov. 9-12 for high-technology senior industrial relations executives.

The fee for AEA members is $395, and $525 for nonmembers.

Also upcoming on the AEA agenda is the East Coast Financial Conference, to be held in Danvers, Mass., on Nov. 17-19.

The cost of this seminar is $225 for AEA people, and $400 for nonmembers.

More details can be obtained from 2600 El Camino Real, Palo Alto, Calif. 94306.

Service Network Cuts Red Tape

(Continued from Page 24)

to develop its own capability in systems design, programming and data management.

Finally PMS had the control over the operation of its management information system that had been lacking with the batch service bureau. But in a period of rising costs (the mid-'70s), the expenditure for leased time rapidly became so high that PMS was forced to look for a suitable alternative. So in September 1976, primarily for economic reasons, PMS acquired its own computer.

After a thorough investigation of the marketplace for a computer powerful enough to meet PMS' specialized reporting needs, yet reasonable enough in price to prove cost-effective, PMS decided on a system manufactured by BTI Computer Systems, Inc. of Sunnyvale, Calif.

The model selected at the time was a 64K-byte BTI 4000 computer system with 16 interactive user ports and

The project administrators proved so adept at handling the myriad details required by the Department of Health, Education and Welfare that the federal agency asked their advice for its own recordkeeping

17.5M bytes of disk storage, later expanded to 32.5M bytes (four Diablo Model 24 and one Diablo Model 31 disks), along with one Digital Equipment Corp. Decwriter II and one Decwriter III hard-copy terminal, three CRT terminals — a Lear Siegler, Inc. ADM-3 and two Soroc, Inc. IQ 120s — and a Zebec Systems, Inc. magnetic tape drive.

The PMS data base, which is now stored entirely on the BTI system's disk, contains three distinct types of information, which can be manipulated internally according to need:

- Registrant information — identification information such as residence area, current and previous payment source and third-party billing numbers, as well as socio-economic data regarding family size, ethnic background and income.
- Health care activity data — information gathered from clinic operations, referral services and hospital admissions.
- Data validation tables — comprised of the codes against which the input data is verified.

Data is entered into the system via a CRT terminal either at the user site or at the PMS computer facility in Santa Fe using both question and answer and CRT form display processes. At the time of entry, the data is automatically checked against the validation tables and other established criteria. If there is any discrepancy, an error message is displayed.

This extensive checking at the point of entry virtually eliminates typographical errors, invalid codes, incomplete entries and assignments of encounters to the wrong individuals. In fact, Gray estimated the entered data to be more than 98% accurate.

Since the data base is kept current at all times, most routine monthly, quarterly and annual reports are generated automatically by the BTI system. This provides a safeguard against possible omission. Extensive use of computer output microfiche gives widely dispersed administrative and clinic personnel quick access to the centrally maintained data files.

Highly Reliable

The BTI computer system has proved to be highly reliable through its years of installation, performing at an uptime of over 97%, Gray said. Further, he pointed out that when most computer and data communication equipment manuals specify that they can operate under "normal" office conditions, they aren't thinking of the New Mexico norm of low humidity, high temperatures, high altitude and dust.

The next big project for the MIS group is to put all the PMS accounting functions, which are presently being done manually, on the system. The first of these will be general ledger, which is expected to be completed within the next year. The computer is already performing cost allocations, Gray reported.

Further down the line are plans to automate financial functions, fixed asset management and real-time pharmacy inventory.

Both Gray and PMS President Smith are enthusiastic about the future uses of the BTI system. They feel the decision to operate their own computer system entirely in-house was a significant one. With the BTI system, federal reports have been both accurate and on time, accuracy of the data base has been improved, and more management data is now available to PMS and clinic administrators.

It starts with the right system, one specifically designed to get a new service bureau up and running fast. The BTI 5000 interactive, multi-user computer system can do just that, to beat those high start-up costs.

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Retro-Graphics VT100 graphics are all displayed on the 12" (diagonal) green-toned screen at 640 x 480 resolution. And refresh raster scan technology results in a bright, easy-to-read display even in high ambient light environments.

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Not Digital Equipment, mind you. Digital Engineering. A somewhat smaller but very bright group who are pioneers in retro-fit graphics. Adding value is nothing new for them. Just ask any of the thousands of Lear Siegler ADM-3A and 3A+ owners whose Dumb Terminals® became graphics powerhouses thanks to Retro-Graphics.

Of course, a great idea like Retro-Graphics always starts with a good one. And the VT100—featuring 96 upper/lower case ASCII characters, up to 132 characters per line, numeric and function keypad, detachable keyboard and a wide variety of screen customizing features—is a very good idea, indeed.

Together, they become one exceptional idea called the Retro-Graphics VT100. The perfect graphics addition for business, scientific and engineering design applications, regardless of whether you want to maintain DEC product continuity or are just looking for the highest quality graphics terminal at a cost hundreds less than the competition.

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Where you'll find the Retro-Graphics VT100, up and running, is at Info '80, New York Coliseum, New York City, October 6-9. Look for it at National Computer Communications' Booth #2132. Beginning in November, the Retro-Graphics VT100 will be sold through NCC as well as by selected other Digital Engineering distributors.

For more information on how and where to order, call or write Digital Engineering directly. As for when to order, we suggest immediately.

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Technical, Personal Seminars Geared to Women

NEW YORK — A series of technical and personal development seminars has been announced by Women in Data Processing, Inc. (WDP).

An overview of telecommunications will be presented at one-day sessions either Saturday, Oct. 11, Friday, Oct. 24, or Saturday, Nov. 8, or at two-hour evening sessions on six consecutive Thursdays, Oct. 2 through Nov. 6.

The career development group is also sponsoring sessions on data base and team management. The one-day data base seminar will be conducted by Shaku Atre on Saturday, Nov. 1. Atre is the author of a book, *Data Base — Structured Techniques and Design, Performance and Management*, that will be available at a discount to seminar participants.

Two seminar workshops on "Building an Effective Team" will be presented either Friday, Nov. 7 or on two consecutive Thursdays, Nov. 13 and 20. The workshops will show how time management is vital to completing projects.

Assertiveness training, specifically designed for women in the computer field, will also be offered. The first session will be seven consecutive Tuesday evenings, beginning Sept. 30. The second session will be on seven consecutive Wednesday evenings, beginning Oct. 1.

All sessions will be held in New York City. For more information contact WDP at Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Forum Regroups Special Interests

CHICAGO — To better meet the current needs of members, Forum International has announced the restructuring of its special interest group (SIG). Forum is the association for System Ten users.

The only SIG that will survive the reorganization is the Client Accounting System (CAS) SIG. Three general SIG categories in addition to CAS have been established: technical, management and applications.

The new SIGs will convene for the first time during Forum/10, Forum's fall conference, to be held here Oct. 20-23. More information is available from Forum International, 4300-1 Lincoln Ave., Rolling Meadows, Ill. 60008.

Session Opens Networking to Women

NEW YORK — A session on networking for women will be sponsored Sept. 26 by Women in Data Processing, Inc. (WDP) at 5:30 p.m. at the Biltmore Hotel here.

The speaker will be Mary Scott Welch, author of the book *Networking*.

Networking links women for information, advice and moral support, and allows women to test behaviors, ideas and strategies within the network before risking them in the real world, said Denise L. Hassman, president of WDP.

More information is available from WDP, Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

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One of the most difficult problems faced by computer centers is planning for future needs, while at the same time meeting today's skyrocketing demands.

But some universities, like Iowa State, have found a simple, practical solution. Distributed processing with Digital. Thanks to Digital's broad line of compatible minis, superminis, and mainframes, they can add and reassign computers as needed.

Distributed processing with Digital means more students get more time on more terminals.

To solve one of their biggest problems—availability—Iowa State bought one of Digital's VAX systems in 1978. The VAX-11/780 gave them the ability to connect 64 interactive terminals to one computer, which they spread out among various math, engineering and science departments. Then when funds became available, they added another VAX-11/780 and 64 more terminals, including several in special dormitory rooms.

"Until we acquired the VAX systems," says Dr. Clair G. Maple, Computer Center Director, "Iowa State was not providing enough accessibility to our students. We wanted to get into an interactive, distributed environment, and the VAX-11/780, with its 32-bit architecture, gave us a lot more power than a standard mini.

"We also look at the VAX system as more than just an object of study, we see it as an educational tool," says Dr. Maple.

The VAX-11/780 is a natural for teaching computer science. But it's so simple and so widely available, just about every department is using it—no matter what level of understanding the students have.

Dr. George Brant from the College of Agriculture explains, "We have a program that teaches students to estimate the amount of meat they'll be able to sell from a steer carcass. The program is already written, so the students simply follow the program sequence, prompted by the system each step of the way. If the student enters an incorrect answer, the computer instantly tells him he's wrong. That way the students get a better understanding of the problem, and can keep on working until they get it right."

Of course the VAX-11/780 is also used for extremely complex computations in departments like mathematics, engineering and aerospace. And it's been a tremendous tool in those departments as well.

Distributed processing with Digital means an introduction to the real world.

According to Dale Anderson, Prof. of Aerospace Engineering, the university's combination of a mainframe supplemented with VAX systems

Yankee Group Sponsors Two-Day ST&T Seminar

BOSTON — An intensive two-day seminar from the Yankee Group focuses on "The Impact of the AT&T Business Unregulated Subsidiary and the Restructuring of the Computer/Communications Industry."

Speakers include Dr. Charles Jackson, technical director of the House Subcommittee on Communications, Philip Verveer of the Federal Communications Commission and Dr. Larry Roberts, president of GTE Telenet Corp.

Additional information on their planning service, or a detailed outline of the seminar topics, is available from The Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138.

And Information Exchange
Ifip Organizing Technical Group

LOUGHBOROUGH, England — An information exchange and technical study group is being organized by the International Federation for Information Processing (Ifip). Technical Committee No. 6 concerning data communications, human-computer communications, networks and message systems.

Ifip is currently trying to determine the extent and specific areas of interest and welcomes suggestions. Suggested topics of study concern human-computer interaction, man-computer communication, user-friendly systems, computer ergonomics and computer human factors.

Ideas for possible information exchange include mailings to participants of a newsletter containing a directory of those working in the field and details of the work. Suggestions for projects or organization structure or anyone wishing to become a member of the group may contact Brian Shackel, Department of Human Sciences, University of Technology, Loughborough, UK.

Mail Systems To Be Topic Of Seminars

CAMBRIDGE, Mass. — An intensive one-day seminar entitled "Electronic Mail: The Message System Approach" will be presented in Boston on Oct. 14, New York on Oct. 20, Washington, D.C., on Oct. 23, San Francisco on Nov. 5, Chicago on Nov. 17 and Dallas on Nov. 19.

Offered by the BBN Information Management Corp. in conjunction with the CW Conference Management Group, this program is designed for people investigating, planning, implementing and expanding computer-based message systems.

The seminar fee is $85 for the morning session, $125 for afternoon-only, and $195 for the full day.

More information is available from CW Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

DPMA to Name Award Winners

BOSTON — The Boston Chapter of the Data Processing Management Association (DPMA) will announce this year's scholarship winners on Sept. 17 at 5:30 p.m.

The three fortunate recipients of the annual Frank Power/Control Data Institute Scholarships will receive more than $13,000 at the ceremony.

Further details are available from Charles Greco at DPMA, P.O. Box 1606, Boston, Mass. 02105.

and more than 40 other minis from Digital gives students a better feel for computers used in the real world.

"We had little distributed processing here until Digital. With the VAX-11/780, students are using terminals interactively to study aerodynamics, structural dynamics and propulsion. Not only do they learn faster that way, they're better prepared for jobs in the real world when they leave college."

"No matter how the system is used," says Dr. Maple, "the students are finding that the VAX-11/780 is very easy to operate. It's had tremendous acceptance to the point that, now, in a peak month, 36,000 log-ins have been recorded, averaging more than 40 minutes each."

The Iowa State story is just one example of how Digital is committed to making the computer a practical, economical and accessible tool for education. We offer the world's broadest and most widely used family of educational computers—from entry-level minis to 36-bit mainframes. Plus the networking tools to tie them together.

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This unique conference provides a meeting place to review and compare a significant set of the systems now available and learn about their characteristics from speakers with firsthand experience in developing and utilizing leading DBMS.

Systems presented include examples of applications of a variety of data representation and structuring techniques and examples of diverse manipulation languages such as host-based procedural or English-like nonprocedural. The products span a full range of applications and are operational on a variety of microcomputers, minicomputers and large processors. They also include completely integrated software systems such as TP Monitors, Report Generators, Transaction Processors, Data Dictionaries, and Query Languages. The systems presentations are preceded by sessions on data base fundamentals, data base architecture and new developments in data management. There is a comprehensive review of the steps and guidelines in the procurement/selection of data base management systems and of the comparative matrices of key features that summarize each product and provide the framework for the systems comparison. There is a session on recent technological advances and current problems under research.

Each participant receives a copy of the visuals and texts of the vendors' presentations and large matrices comparing the key features of such leading DBMS as *ADABAS, DATA CENTRAL, DATA COM/DB, DATAPOINT 2200, DB-IV, DBMS-10, DBMS, DMS II, DMS-90, DMS 170, DMS 1100, DRS, GIM II, DRISS, IDS-11, IDMS, IMAGE, IMS, INFOS, INQUIRE, MIDS, MODEL 204, MRDS, NOMAD, OLIVER, PRODUCT 3, QUESTOR, RAMIS, REALTY, SEED, System 1022, System 2000, TOTAL* and others.

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Introducing China Computerworld

The only specialized computer publication written exclusively for the People's Republic of China (PRC)

The PRC is a huge country with a relatively small installed base of computers. But the future looks very bright for the Chinese EDP business.

Government plans call for extensive use of computers in the PRC's technological modernization, and annual EDP expenditures are expected to grow into the billions in the 80's.

A good deal of this money will be spent on foreign computer equipment, and the decision-makers for this equipment will be using China Computerworld to help them in choosing the products and the companies they need.

China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. and it includes among its 25,000 subscribers the key government officials and computer managers who have EDP purchase decision authority.

China Computerworld will have three monthly issues in 1980, and will be published twice a month beginning in January, 1981. It has tabloid size and a newspaper format, and gives you a unique opportunity to introduce your products and services to this sleeping giant of a marketplace.

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Managers on the Move

RICHARD R. BERTAPELLE, GARY L. PEASLEY, DENNIS RAYER and GREG C. KING have been named vice-presidents at Bankcal, of California. Bertapelle, Peasley and Rayer have been promoted within the systems and project management department, while King is now responsible for the group's corporate services operations unit.

Bertapelle joined Bankcal as a senior project manager and was named assistant vice-president last November. Formerly he was a systems development manager with Western States Bankcard Association, and prior to 1975 was a project manager with Wells Fargo Bank. He received a B.A. degree from Michigan State University in business administration.

Peasley joined Bankcal's systems and project management department as a senior project manager. He was later named assistant vice-president and then group manager. Peasley was a major systems project manager at Bank of America. He is a graduate of the University of California at Berkeley with a B.A. degree in mathematics.

Rayer joined the bank in 1979 as an assistant vice-president and project manager in the systems and project management department. He formerly served as a senior consultant with American President Lines and prior to that was a project manager with the Bank of America. Rayer earned his B.A. from San Diego State University.

King entered the funds management in 1979, later being named assistant vice-president in corporate services operations of Bankcal. He formerly was assistant vice-president and manager of funds management accounting at Crocker National Bank. King has a B.A. degree from Gonzaga University in Spokane, Wash.

•••

FREDERICK MEYERRIECKS has been promoted vice-president of DP for Eastern States, Lake Success, New York. He is responsible for supervising data center operations, facilities, control and communications.

Prior to the recent promotion he was assistant vice-president of DP. Meyerriecks joined the firm in 1976 as a senior on-line programmer analyst.

He holds a B.A. degree in English from Queens College, New York.

•••

WILLIAM T. MALIN has been named vice-president of management information systems for the Federal Land Bank and Federal Intermediate Credit Bank of Columbia, S.C. He will be responsible for effective corporate use of information processing.

Malin has been executive director of the Regional Computer Services, a DP service company operated as a joint venture by the Farm Credit Banks of Columbia, Baltimore and New Orleans.

He graduated from the U.S. Naval Academy and received his M.B.A. degree at the University of South Carolina. After resigning his commission in the U.S. Navy in 1970 to join Electronic Data Systems, Malin joined Regional Computer as manager of systems and programming in 1975.

•••

F. RICHARD LENNON has been appointed vice-president, management information services by Southern Pacific Communications Co. He will be responsible for providing DP support to SPCommunications (SPC), its three subsidiary companies and its litigation and regulatory groups. He will oversee the development of long-term information requirements and manage new information system efforts.

Prior to joining SPC, Lennon served as a manager with the public accounting firm of Deloitte Haskins & Sells. He also was employed by Electronic Data Systems Corp. and IBM.

Lennon holds a B.S. degree in economics from Villanova University, Pa.

Blue Cross Training Program Graduates Second Class

BOSTON — Designed to make programmers out of nonprogramming employees, Blue Cross of Massachusetts' six-month "Initial Programmer Training" (IPT) course has graduated its second class.

The new graduates brought to 27 the number of employees who have completed the course. Selection has begun for the third class, which is slated to begin early next year.

After three years of in-house training, each of its graduates has been successfully placed, Blue Cross said.

The course is divided into two parts. The first is unpaid by the company. After working their regular eight-hour day, trainees put in two hours of classroom study, four days a week for four months.

Those who pass this part are accepted into a full-time company-paid final two months of training. After-hours classes during the first course segment help to contain costs while confirming trainee interest, Blue Cross said.

Because placements are made only after trainees have demonstrated their skills by passing one part, DP managers are assured of qualified candidates, a spokesman said.

Entry criteria include two or more years with the company, one previously taken DP course and a good-to-excellent work record.

Processing Background

"Because most of our trainees come from claims processing areas, they bring practical knowledge and sensitivity to user applications that off-the-street programmers usually lack," Ralph Desmond, project leader, said.

"By training on the exact equipment they will be using after graduation, our trainees are productive sooner and adapt better to company procedures."

Vice-President of DP at Blue Cross Ralph Loftin described the corporate objectives for IPT by saying, "The IPT program is the third stage of a comprehensive DP training effort.

"The first stage addressed the needs of our on-board programming staff. The second was an orientation program for new hires.

Small Business System Wins Applause at Carnegie Hall

NEW YORK — When Carnegie Hall was a service bureau client, its administrators sometimes felt like square pegs in a world of round holes. Their computing needs were not being met by standard programs and services available from a service bureau utilizing a slow batch system.

So when Carnegie executives decided to build their own DP operation, their first step was to decide upon the concert hall's specific DP needs. These, they determined, included help with fund raising, accounting, scheduling and box office operations. Carnegie then developed a two-year plan to build a computer system that would perform those functions.

"We went against the normal process by picking our software consultant first," explained Herb Weissenstein, Carnegie's director of development and head of its computer project. "Once we knew what our needs were, we went shopping for hardware. Usually it's the other way around."

Carnegie Chose Wang

Last winter, Weissenstein examined the products and capabilities of six manufacturers before selecting Wang Laboratories, Inc. as the hardware supplier. The choice was based upon equipment, specifically, flexibility and equipment upgrade potential in allowing Weissenstein and Northeast Data to design the system around Carnegie's priorities. Carnegie's first need was help in raising money.

As a nonprofit organization, Carnegie Hall depends upon effective fund raising. Carnegie's present Wang equipment — a 2200MVP small business system with a disk drive unit, a terminal and a printer — maintains detailed donor records and uses this information to type personalized letters to solicit contributions.

"Right now, we use our equipment for a combination of DP and text generation duties," Weissenstein explained. "Our next step will be to add another terminal and a higher speed printer. When we do, we'll have the capacity to handle all of our accounting in-house."

The addition of another terminal and printer will also allow Carnegie to use the foreground/background capability offered by the Wang 2200 MVP system. This system allows each terminal to perform multiple tasks simultaneously.

When Carnegie upgrades its present disk drive unit with a disk that offers more capacity, the system will be complete. The concert hall will then be able to use the computer to schedule and book house space, handle box office duties and develop and maintain special mailing lists in addition to those currently available for use in fund raising. It is this

(Continued on Page 32)

The staff backstage at Carnegie Hall give rave reviews to their modular computer system from Wang Labs.

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Example: The 9800 is engineered for improved system availability through the use of a photoreceptor drum that can be changed in minutes.

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London to Host Infotech

LONDON — More than 75 of the world's top information processing experts are expected to participate in Infotech's annual State of the Art Review '80 here Nov. 26-28. Recruited from nine different countries, speakers will give specially commissioned presentations.

Designed for senior members of the global DP community, sessions will include future systems, corporate information management, the software revolution and business information, among others. Speakers include Gordon Bell of Digital Equipment Corp., Peter Naur from the University of Copenhagen and Ian Barron of Inmos.

Further information about State of the Art Review '80 is available from Maureen Nichols, Infotech, Nicholson House, Maidenhead, Berkshire, SL6 1LD, UK.

Small System a Backstage Hit

(Continued from Page 31)

flexibility in hardware configuration that allowed Weissenstein to plan his upgrade in a modular approach, he said.

This approach has helped the concert hall's employees accept and use the system.

"If everything were put on the computer at once, it could appear awesome," Weissenstein said. "But by making the move in stages, we hope to avoid this unnecessary fear."

Although the equipment will greatly increase the productivity of Carnegie's staff, no staff reductions are expected. Weissenstein predicted, however, that the computer system will eliminate, or at least delay, the need for new secretarial and clerical staff.

Besides saving the cost of added staff, Carnegie's data and text generation system is directly cutting the cost of computing itself.

For example, Carnegie was spending $6,500/year to have its basic accounting tasks handled through its service bureau. Since the total cost of adding this accounting capability to Carnegie's in-house system was $19,000, the equipment will pay for itself in less than three years.

By the time the complete system is installed, Weissenstein may have enough experience to qualify as an expert on establishing a small computer system. But even at this admittedly early stage in the computerization of Carnegie Hall, he has some general advice for organizations contemplating an in-house computer system.

First, he feels the best investment is in first-class, professional counseling. Mistakes made in the beginning are very expensive since they can lead to purchasing unnecessary, inadequate or inappropriate equipment.

Second, he warns against making the "safe" choice when picking a hardware supplier. Weissenstein was extremely disappointed with equipment offered by at least one major supplier.

Meet Set For Miami

MIAMI — The City of Miami will be the permanent site for Communicaciones Expo, an annual international telecommunications/computer exhibition focused on the Latin American market, the first of which will take place next April 26-30.

Coordinated by the city's Department of Trade and Commerce Development and Latcom, Inc., the event hopes to attract large numbers of foreign buyers, among whom will be high-level Latin American ministers and their staffs.

Admission to the exhibition costs $15. More information is available from Gloria Gomez-Mena de Marina, Marketing & Promotion Division, City of Miami Department of Trade and Commerce Development, Suite 901, 100 N. Biscayne Blvd., Miami, Fla. 33132.

Seeking Work? Kit Offers Help

CHICAGO — An "Executive Job Finding Kit" to help job-seeking executives evaluate methods in making career changes has been compiled by Allerton, Heinze & Associates, a management consultant group.

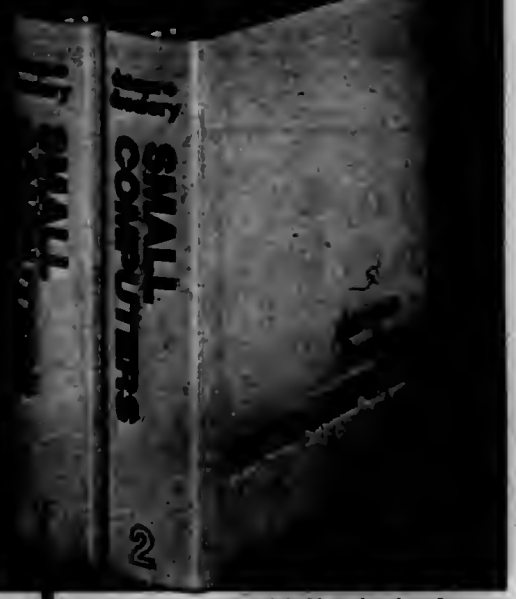
The premise of the kit is that job-hunting is an underdeveloped but critical skill in today's job marketplace.

The kit is free from Allerton, Heinze & Assoc., Inc., 2 N. LaSalle St., Chicago, Ill. 60602.

NEW from datapro

Directory of Small Computers

Datapro's new, objective directory service to help you save time and money locating, evaluating and selecting small computer systems.



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Here's A Sample Of What's Inside. . .

General Index
Your key to fast and easy access to the entire service. Multi level indexing takes you directly to the information you need—by system name, company name, key words, application, report title, section, directory and many other helpful "pointers."

Applications Index
To help you find everything relevant in the service to each of 24 applications areas—(e.g., Manufacturing: all companies, products, services, software, advice, and more.) Included are:
- Accounting
- Banking and Finance
- Computer Management Aids
- Data Communications
- Data Management and Database Management
- Education
- Energy Conservation and Management Systems
- Legal
- Management Sciences
- Manufacturing
- Mathematics and Statistics
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- Sales and Distribution
- Transportation
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- Entertainment
- Facilities, Security and Protection
- Government
- Insurance
- Word Processing and Text Editing
- General Applications
- Other Applications

User's Guide
A time-saving narrative that quickly familiarizes you with all aspects of the service, summarizes each major section, and helps you get even more for your money.

Inquiry Service
By phone or mail, Datapro analysts are at your service to help with your small computer questions. Convenient mail-in forms are included.

Basic Computer Concepts
The essential components and characteristics of small computer systems are explained, and are conveniently cross-referenced to the Glossary section.

Advice and Guidelines
"How-to" in nature and business-oriented in perspective these Datapro reports will show you:
- How to define and prioritize your basic business functions
- How to identify the costs of your current business information system (automated or manual).
- How to compare your current costs to the costs of new in-house small computer system.
- How to estimate how expensive a system you need.
- How to identify potential computer systems suitable to your business and economic requirements.
- How to evaluate these systems.
- How to determine whether to "make or buy" your software packages.

Personal Computers
Definitions, history, market insights, applications and future trends are summarized to help you better evaluate specific product reports in the service.

Small Computer Systems
Hundreds of brief, easy to read reports on individual small computer systems. Each system report includes:
- A concise summary
  - Current Models
  - Memory
  - Base List Price
  - Typical List Price
  - Primary Uses
  - Popular Options
  - Principal Applications
  - First Shipments
  - Number Installed
  - Availability
- Background Information
- System Characteristics
- Hardware/Packaging
  - Processor/Memory
  - Display
  - Keyboard
  - Direct Access Storage
  - Printers
  - Data Communications
  - Other I/O
  - I/O Electronics
- Software
  - Languages
  - Operating System
  - Utilities
  - Database Management Systems
  - Communications Support
  - Applications Programs
- Support Services
  - Documentation
  - Support
  - Terms and Conditions

Company Profiles
Uniform, easy to compare descriptions of over 900* companies involved in the manufacture, marketing, and servicing of small computer systems, including peripherals, software, maintenance and others. Included are industry leaders as well as many new, fast-growing entries to this burgeoning industry. Each profile includes:
- Company name
- Address
- Telephone
- Principal business
- President
- Director of Marketing
- Date founded
- Number of employees
- Sales volume
- Primary customers
- Sales concentration
- Product line description

Directories
Extensive listings of the thousands of companies involved with the small computer industry. Full names, addresses and phone numbers are listed alphabetically and by zip code. Cross-referenced to appropriate reports and profiles in the service to help you quickly locate additional information about their products and services. Included are:
- Manufacturers/Integrators
  - Alphabetical Listing
  - Zip Code Listing
- System Vendors and Stores
  - Alphabetical Listing
  - System Listing
- System Distributors
  - Alphabetical Listing
  - System Listing
  - Zip Code Listing
- Software Vendors
  - Alphabetical Listing
  - System/Processor Listing
  - Zip Code Listing
- Peripherals Vendors
  - Alphabetical Listing
  - Peripheral Type Listing
    - Add-on Memory
    - Cartridge/Cassette Magnetic Tape
    - CRT Display Monitors and Terminals
    - Data Communications Devices
    - Disk Drives
    - Diskette Drives
    - Printers
    - Other Peripherals
  - Zip Code Listing
- Computer Services Vendors
  - Alphabetical Listing
  - Zip Code Listing
- Maintenance Companies
  - Alphabetical Listing
  - Zip Code Listing
- Other Vendors
  - Alphabetical Listing
  - Vendor Type Listing
  - Zip Code Listing

* Figures change with monthly updates.

Fact-packed with Hundreds of System Reports and Company Profiles.

Here's a small representative sample of the System Reports and Company Profiles you'll find in the Directory of Small Computers:

System Reports
Apple II, ⊕
Mattel Intellivision
Megatek Whizzard 5000, 7000
NCR 7500, 8100, 8200
North Star Horizon
Ohio Scientific Challenger, I, II, III Series
Point 4 Computer
Qantel 100, 200, 300, & 900 Systems
Radio Shack TRS-80 Model I, II, III
Smoke Signal Broadcasting Chieftain
Texas Instruments DS990, 99/4
Wang 2200 Series
Plus nearly 200 others.

Company Profiles
Basic Four Corp.
Centurion Computer
Cincom System Inc.
Condor Computer Corp.
Cromemco Inc.
Digital Equipment Corp.
Graham-Dorian
Harris Computer Systems
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North Star Computers
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Calendar

Oct. 8-10, Amsterdam — **Coated Products, Systems and Markets.** Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Oct. 8-10, San Francisco — **How to Build and Use a Data and Information Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 9-10, Albany, N.Y. — **Conference of the Museum Computer Network.** Contact: David Vance, Center for Contemporary Arts and Letters, Library E-2340, State University of New York, Stony Brook, N.Y. 11794.

Oct. 9-10, Houston — **IMS/VS Dump Reading.** Contact: Data Base Management, Inc., Vernon Professional Bldg., 281 Hartford Tnpk., Vernon, Conn. 06066. Also being held Oct. 27-29 in Washington, D.C.

Oct. 9-10 New York — **Financial Analysis for Telecom Professionals.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

Oct. 9-10, Columbia, Md. — **Audit Forum '80, Internal Controls in Automated Systems & Risk Analysis.** Contact: Education Concept Co., 9509 Paragon Drive, Richmond, Va. 23228.

Oct. 9-10, Arlington, Va. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Oct. 10-11, Port Chester, N.Y. — **ACH Spells Profitability.** Contact: Mutual Institutions National Transfer Systems, Inc., 200 Park Ave., New York, N.Y. 10017.

Oct. 12-15, Cleveland — **IBM Users' Conference.** Contact: David G. Lister, Common, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

Oct. 12-16, San Francisco — **Programmers and Analysts Conference.** Contact: Association of Computer Programmers and Analysts, 294 Main St., E. Greenwich, R.I. 02818.

Oct. 12-18, Jacksonville, Fla. — **Data Processing Trade Show.** Contact: Data Processing Management Association, Jacksonville Chapter, P.O. Box 272, Jacksonville, Fla. 32201.

Oct. 13, Paris — **Statistical Packages Presentation.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Oct. 13-14, Atlanta — **Data Courier On-Line Training.** Contact: Data Courier, Inc., 620 S. Fifth St., Louisville, Ky. 40202. Also being held Oct. 16-17 in Norman, Okla.

Oct. 13-15, London — **CMCS Implementation Workshop.** Contact: STSC, Inc. Clearbrook Road, Elmsford, N.Y. 10523.

Oct. 13-15, Los Angeles — **Conference on Comparative Data Base Management Systems.** Contact: University of California at Los Angeles, Department of Management, Labor and Business, P.O. Box 24901, Los Angeles, Calif. 90024.

Oct. 13-15, Atlanta — **Systems Auditability and Control.** Contact: Institute of Internal Auditors, Inc., 249 Maitland Ave., Altamonte Springs, Fla. 32701.

Oct. 13-15, Atlanta — **Essentials of Budgeting for Operating Managers.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 13-15, San Francisco — **Effective Analysis and Design of Information Systems.** Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Oct. 13-16, Denver — **Basic Project Management.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Oct. 27-30 in Seattle and Philadelphia.

Oct. 13-17, Washington, D.C. — **Electromagnetic Interference and Control.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 14, Ft. Lauderdale, Fla. — **Information Resource Management.** Contact: Intel Commercial Systems Division, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

Oct. 14-16, Toronto — **Understanding and Using Computer Graphics.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Oct. 14-16, San Francisco — **Mini/-Micro Computer Conference and Exposition.** Contact: Robert D. Rankin, Suite 202, 32302 Camino Capistrano, San Juan Capistrano, Calif. 92675.

Oct. 14-16, Wellesley, Mass. — **Computer Control and Audit.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181. Also being held Oct. 15-17 in Indianapolis.

Oct. 14-17, Los Angeles — **International Conference of Production and Inventory Control.** Contact: American Production and Inventory Control Society, Inc., Suite 504, Watergate Office Building, 2600 Virginia Ave., Washington, D.C. 20037.

Oct. 15-17, San Francisco — **EDP Operations Today: Effective Scheduling and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 15-17, Atlantic City, N.J. — **Jersey Systems Conference,** Sponsored by the Association for Systems Management. Contact: Mark Robertson, 22 Milltown Road, E. Brunswick, N.J. 08816.

Oct. 15-17, Washington, D.C. — **Records Management for Law Enforcement Organizations.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 15-17, Newport Beach, Calif. — **Computer Contracting — A Practical Guide.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Oct. 15-17, San Francisco — **Computers in Manufacturing.** Contact: American Institute of Industrial Engineers, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 15-17, Chicago — **Electronic Mail: An Overview of Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 22-24 in San Francisco.

Oct. 15-17, Chicago — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: the University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Oct. 15-17, Buenos Aires, Argentina — **Structured System Analysis.** Contact: Compucenter, Suipacha 760 Oficina 14-16, 1008 Buenos Aires, Argentina.

Oct. 15-17, Atlanta — **Data Base Management Systems: A Comparative Analysis of General Purpose Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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Short-Order Updates

POS System Serves Up Restaurant Reports

DALLAS — Switching from a manual to computerized management system that provided constant updates of labor percentages, personnel and marketing data and menu control information proved a boon to The Steak and Ale restaurants, here.

Besides saving time, cutting costs and improving service, the new system gave the restaurant chain the added bonuses of tracking inventory, sales costs and payrolls and producing management reports. Here's how the system works.

Each restaurant has a point-of-sale (POS) device which is basically a computerized electronic cash register manufactured by the Documenter division of Addressograph Multigraph. The cash register is also computerized so that it can store all sales and employee payroll information.

Input consists of guest check information and employee clock-in and clock-out time. The computer/register automatically takes hourly readings, calculates labor percentages, monitors personnel and marketing data, controls menus and produces management reports.

Output is obtained through a Computer Devices, Inc. (CDI) Miniterm 1202 terminal located in the restaurant manager's office. Through the terminal, the manager can extract a printed report at any time of day or night.

Among these reports are sales breakdowns item by item; payroll dollars spent up to the minute; labor percent figures; product mix information, describing how many of what items have been sold; and ones describing what percentages are related to gross sales in the restaurant.

The manager also uses the CDI terminal to change the cash register keyboard. If a menu or price are changed, the manager simply inputs the new information via the Miniterm 1202 to the cash register.

To change a cash register item, the computer asks what key number is to be changed and the manager then inputs the appropriate key number, a new item description up to seven characters in length and a new price.

From this point on, when a waiter rings up a guest check, he simply keys the appropriate cash register key and all the latest items are printed out on a ticket with item prices and totals.

CDI equipment had been recommended for use as a result of an extensive Steak and Ale research and development planning project. The primary reason for the recommendation was reliability, according to Frederick R. Hipp, manager of Restaurant Systems for Steak and Ale.

Issue '80 Slates Meet

ALEXANDRIA, Va. — Issue '80, the fourth annual SPSS, Inc. users and coordinators conference, will be held here Oct. 5-8, according to Issue, Inc., the independent association of SPSS users.

A "short course" in new or enhanced SPSS/SCSS procedures will be taught by the SPSS staff. Other topics to be examined are statistical methodology, data management and local user services.

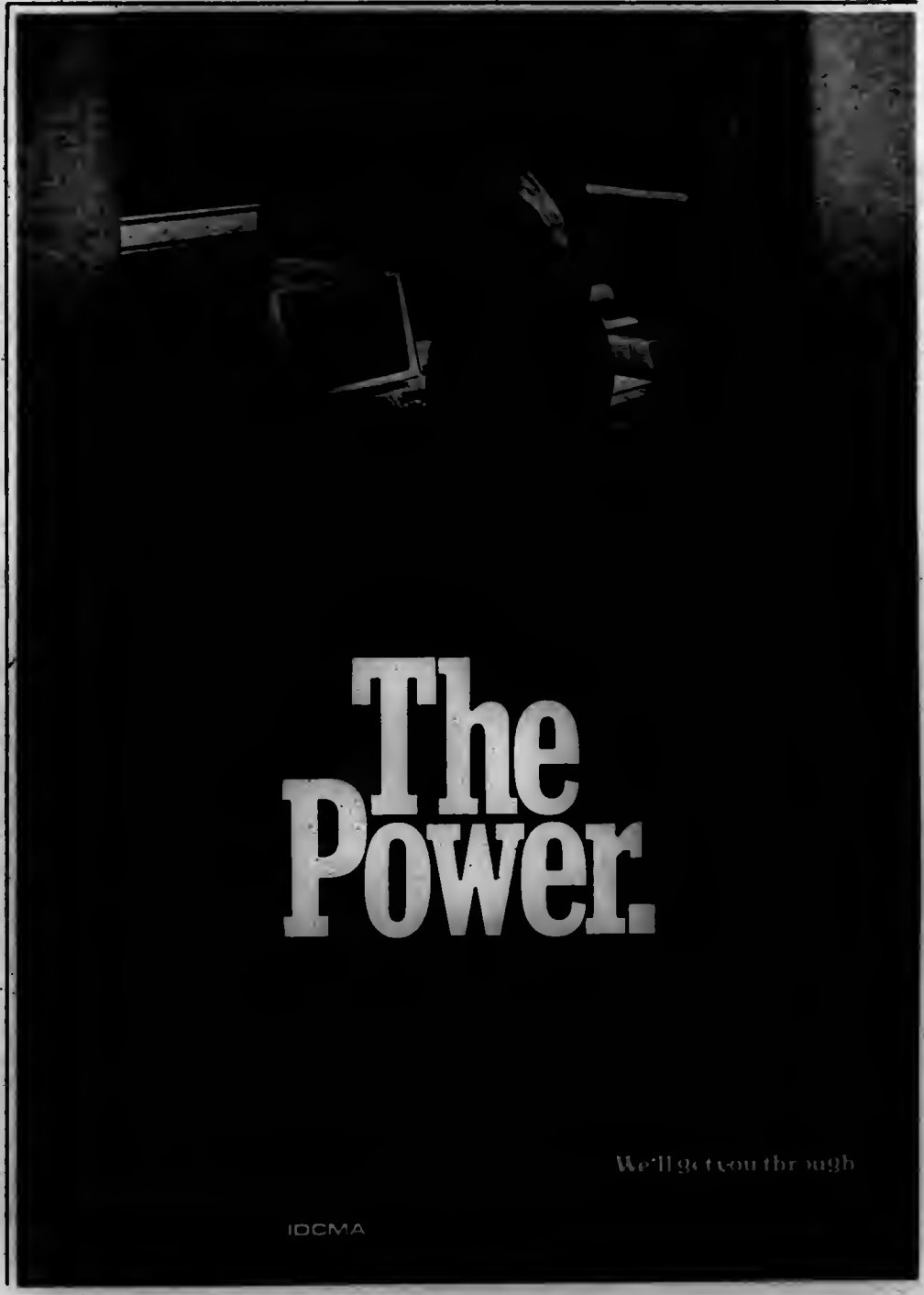
Registration for the three-day event is $75 for members of Issue and $90 for nonmembers. More information is available from Steve Hamburg, Issue, Inc., P.O. Box 8224, Chicago, Ill. 60680.

SCMG Seeking Papers, People

ATLANTA — The Southern Computer Measurement Group (SCMG) is seeking papers for its Oct. 23-24 meeting.

Contributions should be sent to Sidney Finehirsh, First National Bank, 2400 Piedmont Road, Atlanta, Ga. 30324, or Joseph B. Allen, Southern Company Services, P.O. Box 720071, Atlanta, Ga. 30346.

Nominations for the October elections are open as well.



IDMS...The DBMS for On-Line Systems.

Leading database consultants have stated that it is an absolute must that any organization considering on-line systems use a database management system. However, on-line systems demand a particular type of database management system, one that is capable of providing unusually high performance plus elegant backup and recovery facilities. However, users are also very interested in tools for fast application development and easy access to data by and users in an on-line environment. IDMS provides these facilities.

As a result, IDMS has proven an indispensable tool in supporting on-line systems with an extensive number of the most sensitive and important applications for business, industry, and government. From this unique experience has emerged new versions of IDMS and related facilities to support on-line systems meeting the diverse needs of application developers, end users, and processing departments. IDMS, supported by Cullinane Corporation, has been particularly successful because it meets the six key factors for success in database software. They are:

1. Vendor Record: Cullinane Corporation has an unparalleled record for vendor support. (Number One every year in Datapro ratings.) And with an unequaled record in system enhancement and new product development.

Cullinane Corporation is also the most financially successful database software company with the best growth record and highest earning rate of all software companies. As a result, in 1978, Cullinane Corporation was the first computer software company in ten years to have a public offering, thus providing substantial financial resources for product enhancement, new product development, and company operations.

2. Control Via an Integrated Dictionary: The Integrated Data Dictionary serves as the control facility for all information about the database and data communications environment. In addition, it integrates all components of IDMS facilitating easy application development, end user access to data, and efficient processing in an on-line environment.

3. Facilities for Fast Application Development: IDMS is the most powerful DBMS in the world. It allows applications designers to truly mirror a company's operations within the limits of the company's computer processing capabilities. However, users also want to develop applications faster with less skilled people. Simply stated, IDMS has easy-to-use tools for input processing, data management, and output processing. Traditional programming is greatly reduced via the Application Development System, On-Line Query, CULPRIT Report Generator, and the INTERACT on-line program development and word processing facility.

4. Easy Access to Data by End Users: In addition to the user facilities described above IDMS has On-Line English, the only true English language query facility for top management and other users. Management needs to tap the application's data flow easily; but more importantly, it needs the information immediately. On-Line English makes this a reality. Also, the user will not need to know anything about the organization of the database.

5. Computer Processing Efficiency: While users of on-line systems like ease of use, they demand high performance and sophisticated backup and recovery facilities. IDMS was designed to meet these requirements through its architecture which fully integrates the database and data communications facilities. IDMS DB/DC is fully multi-threaded providing for efficient processing in both the update and retrieval modes. Also, an application developed under IDMS DB/DC using the Universal Communications Facility will run under any other TP monitor without modification. In addition, IDMS includes a Shared Database System which supports multiple CPU's sharing databases, eliminating problems associated with shared DASD.

With the introduction of the IBM 4300, users want a system capable of supporting distributed database networks. IDMS is the only database system architecturally designed to support not only distributed access to a database but distributed databases, and combinations thereof.

A facility important to the IMS/DL1 user is ESCAPE which allows use of IDMS with IMS/DL1 applications without modifying the application programs.

6. Protection: DBMS users want two types of protection—protection that their investment in database applications will be protected from any changes in IBM hardware or software. IDMS is written in such a way as to make it virtually impossible for IBM to make any practical move that would make IDMS-based applications obsolete. In addition, Cullinane Corporation contracts state that it has the obligation to keep each user current with any new IBM developments.

DBMS users also want protection that their IDMS applications can be audited by themselves or their respective audit firms. Cullinane Corporation is the world's leader in EDP audit technology and offers user-oriented audit software including a library of audit routines especially tailored to the IDMS on-line environment. Thus, IDMS provides the user with complete protection, the only DBMS to do so.

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2 Toledo, OH
7 Allentown, PA
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7 Phoenix, AZ
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9 Jackson, MS
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Tired of Freeway Hassles?

Remote Terminals May Replace Commuting

LOS ANGELES — Telecommuting.

The word may not be part of most people's vocabularies today, but it probably will be within a few years.

In fact, by 1990 people won't just be talking about telecommuting, according to Jacks Nilles, the University of Southern California (USC) researcher here who coined the word. Millions of people will be doing it, five days a week or more.

And those who won't might be sporting bumper stickers proclaiming "I'd rather be telecommuting."

"Explained most simply, telecommuting is the substitution of telecommunications and computers for the commute to work," explained Nilles, whose research on alternative work patterns is described in Alvin Toffler's bestselling book, *The Third Wave*.

Two Types to Evolve

Nilles, who directs interdisciplinary programs at USC, predicted two types of telecommuters will evolve. Some will eliminate the workday commute entirely, turing portions of their homes into offices.

Others, who need face-to-face contact to do their jobs, will shorten their commutes by traveling to nearby regional offices that are tied by telecommunication systems to central headquarters many miles away.

Converting a room at home into a telecommunications station will not be particularly expensive, Nilles said since it will require only the addition of a personal computer terminal (costing about the same as a high-quality electric typewriter) and a simple telephone accessory to gain access to other computers.

Telecommuters most likely to stay home, he projected, will be specialists who don't usually need face-to-face contact to do their work — researchers, word processors, accountants, writers, data base researchers and lawyers not often involved in court proceedings.

Some workers may combine the two types of telecommuting, going to a regional office for everyday work and staying home occasionally to complete reports, correspondence and other "solo" work.

Some families may telecommute together, with one parent traveling to a regional office, the other working at home on a computer connected to the regional office and the children in charge of proofreading and data storage tasks.

Telecommuting will not become the norm, Nilles said, but it will become a viable work pattern, based on the premise that it's easier and cheaper to move information than to move people. Telecommuting will become feasible for about half the labor force — the workers whose jobs deal mainly with information.

"By 1990, an estimated 47 million people will have information jobs in the United States," Nilles said. "Maybe 2 million to 5 million of those people will be telecommuting to some degree."

Besides having more leisure time, gained by eliminating or reducing the daily commute, telecommuters will enjoy a substantial savings in fuel costs.

In a two-year study funded by the National Science Foundation, Nilles and his research team found the 2,000 employees of a large Los Angeles-based insurance company averaged 21.4 miles per day commuting.

Nilles figures that for every seven employees who telecommute, the annual energy saving would equal the electrical energy required to run an average American home for a year.

Freeway-filled Los Angeles is not the only place where telecommuting will work. "We did a survey of major cities to find out how far people commuted to work. The average distance in large metropolitan areas was only about 12% less

(Continued on Page 38)

Computer Links May Eliminate Commuting

(Continued from Page 37)
than in L.A.," Nilles discovered.

The pressure for telecommuting will go up as fuel prices increase, according to Nilles, who expects to see telecommuting first become common in Los Angeles, Chicago and New York.

The workers' advantages are obvious, but what's in it for management?

Among the 2,000 insurance company employees, Nilles noted a general increase in job satisfaction when the company decentralized and established three regional offices. Once the workers' commutes decreased, the company's turnover rate of 30% dropped sharply.

"People were happier, there was less grumbling and productivity increased 15%," he reported.

Based on the insurance company study and other research, Nilles believes that telecommuting, upon first consideraton, appeals most to the worker and least to management.

He said managers are often nervous about telecommuting — partly because of ingrained ideas about workers and their work habits. The manager thinks, "If I can't see this guy working, how do I know he's doing anything?"

However, Nilles insists that effective monitors can prevent telecommuters from "goofing off." The solution at regional offices is to have two managerial types.

"One is a traditional manager, physically located where the workers are. His function is to be sure workers are there on time and to supervise other physical aspects of the job.

"Job content and performance, on the other hand, are monitored by a specialist-manager — an accountant, a clerical supervisor or whoever is appropriate. He or she can be located anywhere, connected to the other workers by a telecommunications network."

For home workers, Nilles suggested the simplest and most effective monitor would be to judge the quality and quantity of work at periodic intervals.

Edifice Complex

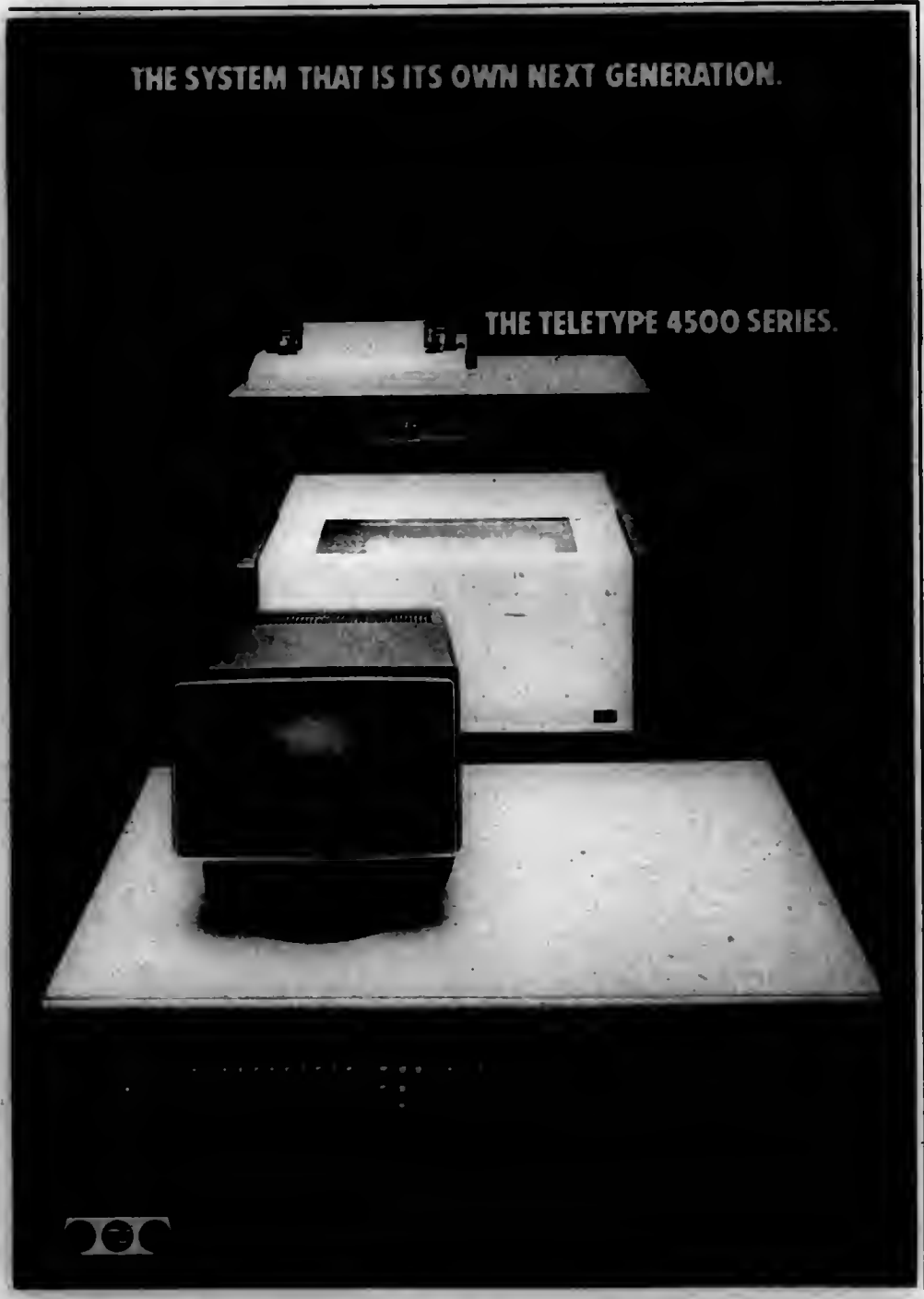
Another managerial obstacle is the built-in aversion many executives have toward computer technology. "The typical manager doesn't like computers — wouldn't be caught dead touching the keyboard," Nilles said. Other corporate executives have what Paul Gray, a member of Nilles' research team, calls "the edifice complex."

"They think they have to have a building with the company's name on it," Nilles explained.

Nilles hopes to persuade victims of the edifice complex and other nonbelievers that telecommuting can be good for business.

"A lot of psychological barriers will have to be overcome," he acknowledged. "And some effects of telecommuting, such as possible feelings of isolation for home workers, need to be examined."

These days, Nilles divides his hours between working at his USC headquarters and telecommuting from his home. His book, *Your Personal Computer: Friend or Foe?* is scheduled for publication next year.



Course Set On Crime

SAN FRANCISCO — A three-day workshop on "Computer Crime: Investigation and Prosecution" will be held here on Sept. 30 — Oct. 2 by *Assets Protection Journal*. It was designed for security and law enforcement investigators, prosecutors, attorneys and computer specialists who have had training and/or experience in investigating financial or computer crimes.

The program will include actual case studies presented by experienced investigators who will cover initial case planning, investigative methodology and techniques, evidence gathering and analysis and case preparation and presentation.

The workshop fee is $575. More information is available from Paul Shaw, *Assets Protection Journal*, Suite 503, 500 Sutter St., San Francisco, Calif. 94102.

Best Results In CPU Test

Decstation 78 Excels in Business Applications

By Hillel Segal

Digital Equipment Corp.'s entry in the less-than-$15,000 price range performed well in the CPU-intensive benchmark test of the Association of Computer Users (ACU). But it was in the area of business applications software that users said the Decstation 78 was strongest.

The system's best result was its time of 31.8 seconds in the math-oriented CPU test. This put it second among the first six systems tested in Series 1 benchmark reports of similarly priced systems.

Comparisons of the Decstation 78's times with others in the series should be made with caution, however, since the DEC 78 uses a compiler, and test results reflect the total time for compilation and run of the benchmark program. In most applications, the run-time would be the more significant element of the two-step process. If run-only times for the system were available, the comparison would be much more favorable to DEC.

Near the Lead

While the Decstation 78's result in the CPU test gave it a position near the lead in that aspect of performance, the tests emphasizing diskette access ran slower. In the disk I/O-intensive test, the Decstation 78 was positioned much further down in the six-system group.

For the real-life applications tests, the DEC time (again including compile) placed the system in the low mid-range of the six-system group. The scientific/engineering test was completed in 22:35.6, and the accounts receivable problem in 5:04.8.

The configuration tested included a VT78 processor with 16K words of memory (each 12-bits long), a video terminal, two double-density disk drives and a 180 char./sec printer. This combination, along with the operating system Basic and a stand to hold the computer and disk drives, was quoted by a DEC computer store spokesperson at $11,570.

The price straight from DEC itself would be somewhat higher, at least for the single-quantity buyer. Most buyers, however, currently purchased the system through an OEM who installs the system, trains users and provides software support.

An unusual aspect of the hardware is the 12-bit word length used by the VT78 processor. This enables arithmetic calculations of 16-digit accuracy, as opposed to the more conventional six-digit accuracy of many Basic systems. It also allows two-instruction fetches from memory, which speeds up execution.

DEC Basic

The version of Basic supplied with the Decstation 78 presented some difficulty during the benchmarking process. While file manipulation statements and output device references commonly vary from version to version among different manufacturers, the DEC Basic added a new wrinkle.

The system required that arithmetic positioned on the report output be defined as string variables, and constants needed quotes around them in the source code. Numerous modifications to the standard programs were necessary as a result of this restriction.

At the same time, it should be noted that, in practice, relatively few users of the computer do their own programming, and most applications are written in Dibol. As a consequence, inconveniences introduced in the Basic compiler do not affect customers as much as they would in a computer marketed as primarily a user-programmable system relying heavily on Basic.

As mentioned, the DEC Basic is a compiled, or more precisely, a semi-compiled version. The compilation may be treated as either a separate step in the program development process, or as part of the run. If treated as a separate step, an object file of intermediate code is produced which during run time is interpreted into machine-executable code.

The optional separation of the compile and run steps has the effect of saving time during the program run, although not as much time as would be saved by a true compiler system that dispenses with the intermediate code and the run-time interpretation step.

While the editor included with the Basic language did not rate at the top in number of keystrokes used, it was very easy to operate. A more sophisticated symbolic editor with global search-and-replace and block insert/-delete is available as a separate part of the operating system.

Sophisticated utilities supplied with the Decstation 78 include a disk packing routine to eliminate wasted storage space, a line-by-line file comparison feature and commands to set printer and terminal margins and character sets.

A trace feature provided as a debugging tool follows the execution of a program, showing the order in which each program step is executed.

DEC customers were contacted for comments about the system by the independent consulting firm which performed the tests, and they indicated that hardware speed was not their highest priority. Most users said that software was a key criterion in choosing the system, and in that respect, DEC's applications packages were the deciding factor.

Customers agreed with ACU consultants that the system is easy to use. The operating system and applications packages are menu-driven.

DEC supplies applications packages in the areas of accounts payable and receivable, general ledger, invoicing and inventory control, payroll and word processing. OEMs offer these or modified versions of them, as well as additional applications software.

In most cases, the system is sold on a turnkey basis to customers who wish to purchase a specific application system rather than a general purpose computer. "The most important factor in choosing a computer is software," one user said.

It was a bit surprising to find that there were very few complaints about software or the support provided by OEMs. This was in contrast to comments received on several previously tested systems sold through OEMs, where the quality of customer support varied greatly from vendor to vendor.

Experience with one or more hardware problems was mentioned by more than half of those surveyed. Here, the users again praised DEC service. Disk-drive difficulties were most frequently mentioned: the mechanical aspects of floppy disks have been notoriously troublesome throughout the industry.

One area of negative comments on the system related to the 16K-word memory size, which can be a limiting factor in larger applications. Also mentioned was the speed of some operations. "Searching time is slow and sort programs take a long time to execute," one user noted.

DEC officials stressed that the system was not intended to be the fastest computer on the market. Its strong points are considered to be ease of use and good applications programming.

Next week: The significance and interpretation of benchmark results.

SCOREBOX

System: Decstation 78
Current Price: $11,570

Series 1 Results**** Systems up to $15,000	C-1 Scientific/-Engineering Time	C-3 Accounts Receivable Time
Pertec PCC 2000	28:48.4	6:04.3
North Star Hortzon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	22:35.6*	5:04.8*

Series 2 Results**** Systems $15,000 to $25,000	C-1	C-3
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.6	3:20.0
Texas Instruments FS990/10	**	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11VO3	14:43.4	4:14.0
Q1 Lite	6:50.7	5:03.3
Univac BC/7-610	12:09.2	10:37.0
Northern Telecom 405	**	***
Datapoint 1170	38:27.5	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	**	2:48.3

*Results include both compile and run time.
**Test could not be run because of memory limitations.
***Test could not be run because of formatting limitations.
****Both Series 1 and Series 2 were run on the same programs.

This is the 18th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

EDITORIAL

Irresponsible Attitude

330,730 Americans died of cancer in 1970, the year IBM decided to use a "suspected carcinogen" in its first copier, the Copier I. Prior to that, the chemical in question — Trinitrofluorenone (TNF) — had been found to produce tumors in tests on laboratory animals.

IBM pushed ahead with its copier program despite the knowledge that every Copier I customer would be exposed to TNF.

Since 1970, thousands of Copier Is and Copier IIs — as well as 1,200 IBM 3800 laser printers using the same technology — have been placed with unsuspecting users.

IBM was not alone in its use of toxic substances in products manufactured for the public in that period. To help protect the public from such chemicals, the Toxic Substance Control Act was passed in 1976. That act required companies to notify the Environmental Protection Agency (EPA) 90 days before marketing new chemicals.

With passage of the law, did IBM take the opportunity to notify the EPA it was marketing a suspected carcinogen? No. The law was not retroactive, so the company didn't have to.

No new research had been done on TNF and all the old data was available in "open literature." One such source was a 1962 study conducted by Huggins and Yang that established TNF as "a medium potent mammary carcinogen in rats." That determination, a much harsher indictment of TNF than any arrived at by IBM researchers, might have given a less imperious organization cause for reconsideration, yet it didn't stop IBM.

While it is true that no case of cancer in a human has ever been linked with TNF, the risk to humans may still exist.

We find it amazing that IBM waited so long to let its customers know it was using TNF in these printer products.

So what's a little TNF in the environment? Lots of chemicals commonly used in our everyday life have produced tumors in laboratory animals. Saccharin is a perfect example. Yet millions of people use saccharine in their coffee every day. Cigarettes, too, have been linked with cancer — in humans, not just laboratory animals — yet millions of people use them every day, too.

But there is an important difference in the latter two examples. The products are clearly marked and the individuals who choose to risk their use are making that choice themselves.

In the case at hand — the IBM printer products — IBM knew there was a risk and did not make that information public.

At a time when cancer will predictably strike one out of every four Americans, it is nothing less than irresponsible to offer for public consumption a product containing a known carcinogen.

LETTERS

Sticking With Cobol

I would like to respond to the recent letters endorsing PL/I over Cobol.

PL/I is admittedly very powerful, but that power is also a source of potential trouble not found in other languages. Because PL/I has such inherent flexibility, the user must explicitly define the attributes of all variables or suffer the consequences. Consider:

```
t = 1;
X = t + .1;
```

The value of X is 1.0625, *not* 1.1. The variable I is fixed point binary, whereas .1 is fixed point decimal. The addition requires conversion to like bases, in this case binary. One decimal digit is carried to *only* four binary digits.

The conversion is inexact — that is, $(.1)_{10} = (.0001)_2$ — and therein lies the problem.

Robert T. Grauer
Coral Gables, Fla.

Missed the Point

I applaud *Computerworld's* coverage of structured methodology, but I think the recent article "Structured Methods: Pros and Cons" [CW, Sept. 1] missed the point. The point is that structured methodology is a set of interrelated techniques which must generally be applied simultaneously if we are to make software development the humane and productive enterprise it must become.

Syntex's use of walk-throughs is interesting, but the article doesn't indicate what other techniques it uses. I would suggest that walk-throughs are of negligible value in producing quality software if your people use unstructured techniques to specify, design, code and test software.

The case of Al Volpe proves only that a good concept can lose its value if it is applied in an extreme and ignorant fashion. I doubt that there are many people who would consider a 6,000-statement Cobol program a paragon of structured methodology.

As Volpe suggested, it is possible to write a GOTO-less program which is unmodifiable. I don't think anyone ever suggested that GOTO-less programs mean absolutely no GO-TOs.

I would ask Volpe to consider a broader view of structured methods.

Cary Coovert
Natick, Mass.

Not 'Out of the Blue'

Alan Taylor's recent column concerning NCR Corp. and user Perl-Mack Enterprises of Denver [CW, Aug. 25] contained inaccurate and misleading information about my background and about the way I was chosen as arbitrator in the case.

1. I am presently employed by Computer Devices, Inc. (a hardware company), not Computer Services, Inc. as reported. As such, there are no contract terms which would bias my decision.

2. Although I am not listed in the Lawyer Directory, it is by choice, as all my clients are sent to me by referral and are not walk-ins.

3. My background in computer services, systems and hardware is extensive, and I was therefore selected by the American Arbitration Association to arbitrate this case. I was not nominated "out of the blue."

4. Finally, I am a dual professional in law and data processing, and the combination of my education and experience uniquely qualifies me to meet this challenge.

Taylor's technique is not new. It is typical of the new wave of self-centered journalism that worships innuendo as its godhead. For him to write, for example, that I was nominated out of the blue is not only journalistic arrogance but a sheer flight of fantasy.

Kevin M. Mahan
Covina, Calif.

DATA PAST

Five Years Ago
Sept. 24, 1975

FORT LEE, N.Y. — IBM's System Management Facilities (SMF) was inadequate as a performance measurement tool, according to three separate studies at user installations. In each case, the study was geared to evaluation of IBM's and an independent vendor's sort package, and each utilized a hardware monitor to get what were finally considered accurate measurements.

Users of all the more popular data base management systems (DBMS) were generally happy, but users of DBMS from independent software houses tended to like their systems better than users of IBM's IMS liked theirs, according to results of a *Computerworld* survey. Adabas from Software AG came up with the highest weighted averages.

Eight Years Ago
Sept. 20, 1972

WASHINGTON, D.C. — A draft revision of the 1968 Cobol standard was completed by the American National Standard Institute (Ansi) technical committee X3J4. Under the new plan, there would be a nucleus and 11 functional processing modules in the complete ANS Cobol, rather than the nucleus and eight modules that made up the old standard.

SOFTLINE/Werner L. Frank

The Software Scene

Software is difficult to conceive as well as to construct. And software is a subject about which much is said, but less understood. Software is a topical item.

That is why we are beginning this series of columns to explore views, myths and facts about an area which overwhelms the data processing scene.

To get started and set the stage, let's look at some software-related statistics which continually reappear in the literature and thereby seem to be achieving credibility:

- There exists worldwide more than $200 billion worth of developed software which is more than twice the value of the installed hardware base.
- The software/hardware cost ratio has moved from 20/80 to 80/20 in the last 25 years.
- There are just under 500,000 programmer/analysts in the U.S., approximately 40% of the DP work force.
- Only 15% of the total DP labor is available for new application development.
- Software maintenance occupies 60% of an installation's manpower efforts.
- Personnel costs, often equated to software costs, are 40% to 50% of an installation's total DP expenditure.
- Software purchased by DP installations is 2% of the total budget.
- System software costs associated with some new computer offerings are increasing by factors of three over predecessor systems.
- Software product sales are increasing at more than 30% per annum, representing the fastest growing segment of the computer services industry.

This is the first appearance of Softline, a biweekly column that will deal with software-related topics.

- Software productivity improvement appears to be at a near-standstill.
- Average time to develop a new application is two years.
- Average number of lines of code produced per unit of time is invariant for the different implementation languages.
- The application programmer produces 10 to 15 debugged lines of program per day; the systems programmer generates about one third as much.
- Individual programmer differences in rate of program statement generation and in end program efficiency can easily differ by an order of magnitude.
- The use of structured programming techniques will double the productivity of the DP effort.
- Application development systems have the potential for increasing productivity over the software life cycle by an order of magnitude.
- The number of errors/defects in 1,000 lines of code are on the order of 1% to 5%, depending upon use of structured techniques or conventional methods, respectively.
- Only one sixth of the total effort in developing an application should be devoted to programming; the balance of activity is involved in design and testing.
- User's average backlog of number of pending applications awaiting development stands at more than ten.

Not Necessarily True

It is not clear nor certain that the above assertions are necessarily true. In many cases, it is difficult to reach conclusions because of the unavailability of the underlying facts. We even differ on definitions. For example, what do we mean by productivity? Is it code generation per unit time? Or is it a performance measure based on some nominal standard? Or is it quality of code or quality of satisfying a user's needs?

The above data and observations are often presented to demonstrate the problems of software development and operation. There seems to be an underlying hope and expectation that software should be more predictable, maintainable, operable and certainly less expensive. In a world of continuing decreases in unit hardware prices and accompanying increases in performance, software cost effectiveness does not seem to keep pace.

Indeed software is the whipping boy of DP. Software results in project cost overruns as well as schedule slippages. Software is treacherous because it often produces incorrect results or at least does not perform according to the end user's expectation.

We are also unhappy at the seemingly low productivity in software development by practitioners who may have had many years of experience. And we are displeased that software needs so much tender care, an

(Continued on Page 42)

READER COMMENTARY/Michele Landon

Capacity Plans Pay Off For Shops of All Sizes

In the data processing industry, the need for hardware forecasting and the economic payoffs resulting from capacity planning and hardware fine-tuning have not yet been fully recognized.

A clearly defined and easily implemented forecasting procedure for all equipment, from mainframes and terminals to remote job entry (RJE) equipment and printers, prevents two extreme situations from occurring. The first is having more hardware or the wrong combinations of devices than can practically be used, and the opposite problem is not having enough power to support the software and programming staff.

Both of these extremes are more complicated than at first appear.

Having more hardware than can reasonably be used in the near future wastes financial resources which might be used to acquire more software or programmers. For example, having more terminals than the mainframe can support wastes the dollars spent on the terminals as well as programmers' time as they wait for a response from an overload mainframe.

This, of course, leads to the other extreme. Any shortage of hardware leads to a loss of programmers' time. A prime example of this is the situation which often exists when time is wasted waiting for printouts because of insufficient printing resources.

Although much has been said about programmer productivity, the direct relationship between capacity planning and productivity has not been fully explored.

Insufficient hardware is also responsible for inefficient use of software and, consequently, poor performance. Today, with many users linked directly to the computer and immediately aware of performance problems, allowing deficiencies is poor business. So, in fact, capacity planning is a powerful economic tool and should be implemented in shops of all sizes.

Several points should be considered in a complete and thorough procedure:

1. Capacity planning should be done for all hardware.

Although the mainframe is the largest, most expensive and most important piece of equipment, all peripheral devices need to be included. For the mainframe, both CPU time and core should be evaluated. In larger, more sophisticated machines, the CPU time needed to run a job will be less than that needed by a smaller machine. However, in simplest terms, there is only a finite number of seconds a machine can run, and the amount of time your machine is using is of prime importance in determining its capacity to turn out more jobs.

The core available to run jobs is of equal importance in nonvirtual storage machines. In virtual storage machines, the actual core available might not be as important, but even in a virtual machine, certain software and also certain jobs have to be run in real core. For purposes of fine-tuning in a VS shop, both real core and paging rate should be considered. If the paging rate is excessively high, more CPU is used by the paging supervisor, and the trade-

(Continued on Page 44)

READER COMMENTARY/James Rosenwinkel

Lax Documentation Effort Can Kill Team's Morale

Documentation is not generally considered to be one of the more fascinating aspects of a systems project. The subject is sometimes considered boring to talk about, to listen to, to read about and even to write about. In fact, about the only thing less stimulating than reading another dry article on documentation is performing the actual task of compiling documentation. That's one strike against the cause for good documentation. It's not very interesting.

Documentation is not visible. If it's there, it isn't easily seen. Task priorities have been known to shift in favor of more visible tasks. As long as the project appears to be floating along successfully, no one is really going to miss the life boat. Strike two.

The final blow is the optimistic notion that the result of a great documentation effort may never really be needed. If the system is designed logically, if user procedures are complete and if the coding is straightforward, much of the documentation might be redundant anyway. Why make a double effort to protect an "unsinkable" system? Strike three.

Because of these three simple reasons, some of us will find ourselves, today, in at least one of the following categories:

- We're assuming documentation is there because we don't need it.
- We're hoping that it's there because we have a feeling we might need it.
- We're wondering where it is because we're beginning to sink.
- A project has recently settled on the bottom and we're still wondering where the documentation was.

Not taking the extra effort to keep system project documentation from falling victim to these natural hazards paves the way for additional, and potentially greater, problems. More specifically, if system project documentation is not a daily task during the course of the project, we open the door to morale problems on the project team.

Process Behind It

Crisp, clear, accurate documentation should be an integral, vibrant force throughout the evolution of a systems project. Compiling and using system project documentation should be an ongoing process throughout all phases of the project. The project team's familiarity with the documentation structure should at least equal a programmer's familiarity with TSO.

If we assume that system project documentation is only an end result, an after-the-fact activity, some place to go when there is a problem, there will be a price to pay in each of the following areas:

1. There is only one way to thoroughly review the quality and feasibility of a planned system's design. Complete, clear and accurate documentation must be constructed. It must be available at each milestone, or point of evaluation. Poor design or other faulty front-end work must be identified as soon as possible to keep coding or pro-

(Continued on Page 42)

Lax Documentation Plan Can Kill Team Morale

(Continued from Page 41)

cedure development from turning to waste. It is difficult for a professional to watch long hours of coding or procedure work turn to useless scrap paper.

2. As a system project progresses through its phases, a myriad of questions will arise. If the supporting documentation is not accurate, simple questions can easily lead to confusion, false assumptions and misunderstandings. Getting the right answer should not depend on asking the right person at the right time.

3. There are temporary absences and a turnover factor for every project team. Whenever a team member does anything that is inadequately documented, that person's absence will mean an additional burden will eventually shift to the remaining veterans on the team. This additional burden will consist of "placing together what happened." This kind of unplanned task is never popular.

Documentation Support Group

Merging documentation activities with the daily duties of a system project team should be encouraged. A possible first step is the formation of a documentation support group within the systems development area. This independent unit would assist selected project teams in the creation of the documentation for their project.

The scope of the support group's involvement could vary by project according to the needs of management. Accordingly, the following five responsibilities for the group would vary with each project, depending on the scope of each assignment:

1. Assist the project team in determining documentation needs. This might include familiarizing the project team with company and departmental documentation requirements, standards and so forth.

2. Assist the project team in developing a customized methodology to maintain control over the status of documentation. This might be nothing more than setting up an open file of memos, notes on decisions made or pending changes in requirements and so forth and how each item affects the documentation. A more involved technique would be to design a formal control document.

3. Review with the project team on a regular basis (perhaps weekly or biweekly) the level of success in keeping the system project documentation current.

4. Gain a departmentwide familiarity with documentation compilation. This would enable the group to identify common obstacles, common problems and any redundancies of effort.

5. Provide project manager with estimates for the time required by the project team to comply with the documentation requirements.

These five contributions are secondary to the one main value a documentation support group would provide. It would exist as a symbol of management's realization of the advantages in making system project documentation a process.

Rosenwinkel is a consultant for CNA Insurance who specializes in user documentation for new systems.

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"As automation costs continue dropping... the mid-1980s will see a doubling of present office worker capitalization levels... due mostly to the popularity of word processors and facsimile devices."
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"We are, indeed, fast approaching a time when a service company's data communications networking capability determines, in significant part, its success in the market."
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"Data communications is becoming economically viable for many applications and in many environments where only a few years ago it was a pipedream. Near the top of this new and growing list is general-purpose message switching... electronic mail."
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"By the time the legislators come to grips with electronic mail and USPS, they will have to give serious consideration to this question: Why couldn't the postal service launch a separate subsidiary that would operate ECOM—Electronic Computer-Originated Message Service—and ultimately a broader, publicly accessed electronic message system? ... It might be the only way the U.S. Postal Service will survive."
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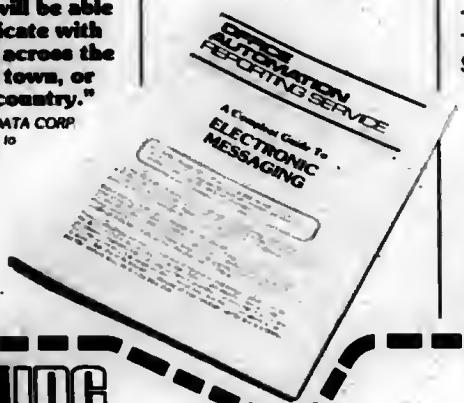

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Software Scene: An Overview

(Continued from Page 41)

activity which we label "maintenance."

Since software is a human creation, it is as solid or as frail as those who are its authors. This people intensiveness makes software more a craft than a disciplined engineering task. Hence, opinions vary. Approaches to issues and their resolution are often widely divergent, which gives us plenty of room for comment.

And so we hope to engage in both presenting viewpoints as well as questioning positions. We wish to impart information as well as clarify issues. This column will also serve as a forum for discussion of points that remain controversial. And there will also be opportunity for readers to contribute.

We will, in turn, look at subjects such as:

- Definition of the software budget component.
- Significance of maintenance.
- Critical factors in software production.
- Productivity-enhancing issues.
- Organizing and controlling the software effort.
- Impact of implementation languages.
- Role of firmware/hardwire software.
- Cost effectiveness of software.
- The software product in the commercial marketplace.

Welcome to Softline.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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HUMAN CONNECTION/Jack Stone

Readers Toss Bouquets, Brickbats at Trade Press

My survey of readers on their opinions of the DP trade press [CW, Aug. 18] brought a deluge of mail. Many people chose just to fill in the blanks; others wrote emotion-packed comments and letters, both pro and con, about the DP trade press.

For the former group, the ratings were so widely varying for people in the same profession from the same industry sector that I really couldn't draw any significant conclusions about what particular groups of people thought about the trade press.

As usual, a number of readers complained about the anti-IBM bias of the press, a subject I don't intend to pursue in this column. But let me touch on some other comments:

A trainer/consultant from industry, on hardware coverage: "Overkill!"

A recruiter who entered a 5, the highest rating, on all counts: "Without *Computerworld*, I wouldn't be as successful as I am."

A programmer/analyst who rated hardware 5, applications 1 and professional development 0: "Has any part of the trade press ever taken a stand on the certification issue?"

An executive from the education industry, who gave "industry news" a 5: "Thorough, but boring, boring . . ."

An auditor in the banking industry: "Many times I find CW more interesting to read than the evening newspaper.

"I used to manage a small mini-shop for a savings and loan firm. It was then I began subscribing to CW. At first, I couldn't understand the articles because I didn't feel they related to me and threw them onto a pile of backlogged reading material . . .

"Then I acquired a new boss, and DP awareness became the main theme. So I went back to that old stack of CWs and read the articles one by one and started to learn about the buzzwords the vendors toss at you . . .

"The point is that the DP trade press could be used to educate a young graduate like myself whose career situation required a heavy exposure to data processing . . ."

A college professor who gave "employment ads" a 5: "If I weren't looking for a better job, the grade would have been a 2 or 3."

An executive in the computer industry for two decades, who gave "editorial" coverage a 1: "Editorials are 40% journalistic 'hype,' 50% B.S. and 10% practical and timely."

An analyst who assigned an overall grade of 3 to the coverage: "My thinking is that our trade press is still missing a retrospective look at where we have been; and analysis of where our past is leading us (and how it might be different if another option were taken); and an indication of what it really can be like "if" — if we had the time, budget, labor? Are there any success stories?. . .

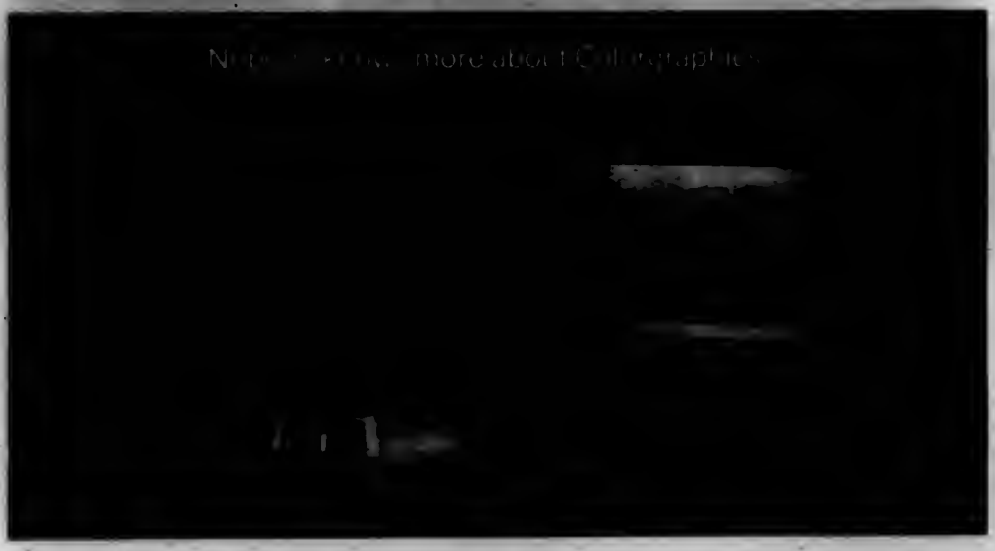
"Moreover, we have to get a handle of the user's perspective. Do any users read our trade press? What for?"

An actuary for an insurance company, with heavy experience in scientific programming: "In spite of my long-time involvement with programming and computers, I consider myself an end user. Why? Because the goal of any of my programming assignments is never the program itself, which I view only as the means to accomplish my specific assignment.

"In addition to our own minis, our company has a large-scale installation and a staff of DP professionals who are badly misused and/or mismanaged. Their problems are perhaps typical of management of the DP function and suggest a desperate need for more attention to humanistics.

"Your column serves an important purpose in highlighting these areas. Good luck in your survey!"

Ask Ramtek.



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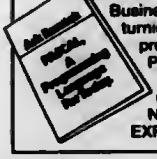

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Capacity Planning Pays Off in Any Size Shop

(Continued from Page 41)

off between more CPU and the possibility of adding a megabyte more of core has to be evaluated, especially if CPU utilization is reaching capacity.

Peripheral devices that can affect overall capacity and performance and that should be carefully planned for are RJE units and printers for the batch environment and terminals and control units for the on-line environment. Storage-related devices such as channels, tape and disk drives, as well as tapes and disk packs, should also be included in any hardware forecasting procedure.

2. Monitor usage of all hardware.

There are many software packages that monitor hardware usage. They usually have an interface with the operating system and can measure and report on most aspects of hardware utilization. This utilization can often be broken down by job and program in a batch environment, and by transaction and program in a communications environment. This breakdown is of particular use for fine-tuning. It can be used to arrange for a better mix of jobs so, for example, several jobs that require large amounts of tape drives can be single-threaded, allowing several other jobs to run concurrently with each of the demanding jobs.

3. Develop mathematical relationships between the mainframe and other devices wherever possible.

After the initial monitoring, the number of CPU seconds used should be measured against the number of seconds the machine is actually operating. There are often relationships between the amount of CPU used on one machine and the amount used on another machine, or between CPU and channel usage, printer usage or other utilizations.

At this point, it may be wise to attempt some mathematical modeling to develop numeric relationships so that projections for CPU utilization can be used to forecast utilization of devices for which independent projections are difficult.

Mathematical relationships can also be used for fine-tuning purposes. For example, if two channels running against the same CPU have an unbalanced relationship, when projections are extrapolated on the equations, a potential critical channel problem can be foreseen and changes can be made before the overloaded channel ever reaches capacity.

4. Establish projecting procedure.

The present utilization can be used as the base for making projections. For both capacity planning and performance, it is necessary to be able to project when hardware will reach its capacity limit since lead time is needed to order, obtain and install new equipment.

The monitoring reports should include breakdown of CPU and other utilizations by several main categories — batch production, batch development, TSO or CMS, data communications production and communications development. Production is usually fairly stable, and new production utilizations should be provided as part of the system development project.

So the major outstanding factor is development projections. These are dependent on two factors that may or may not be related. One is new projects planned to be developed, and the other is planned programming staff. Of the two, programming staff is probably more significant.

Mathematical relationships may exist between number of programmers and resources used, and a pilot should be done over several months measuring the number of programmers against TSO or CMS usage, batch development and communications development utilizations. A linear equation can then be developed and if there is a high positive correlation, projections of development utilizations can be based on planned programming staff.

5. Establish reiterative forecasting cycles.

For the hardware forecasting to be useful in providing sufficient lead time to order new equipment and refine performance, it must be done on an ongoing basis. It should be a reiterative process where past projections are compared to actual utilizations and future projections are modified based on new developments in the shop and in the industry. A semiannual, two-year projections cycle would probably work well for most shops.

Each shop will, of course, develop procedures and standards that meet its specific needs. What is important is that procedures for hardware forecasting, capacity planning and fine-tuning be developed and implemented. In our industry, we perform a visible, essential service, and we should provide ourselves with procedures to ascertain that we will have the tools of our trade when we need them.

Landon is a supervisor in the Commercial Lines Automated Division of Hartford Insurance Group in Hartford, Conn.

See page 109 in Buy/Sell/Swap

Attention: Engineers Age 40 and Up

Put yourself on easy street by spending pre-retirement years with Aramco in Saudi Arabia

Retirement incomes that sounded princely a few years back are beginning to look paltry in today's economy. And they may be hopelessly inadequate in tomorrow's.

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LETTERS

Readers Stand Up for Contract Programmers

Hard to Swallow

With regard to "Managers Warned of Contract Programmers" [CW, Aug. 18], while I enjoy your publication immensely and would be lost without the information it provides, I find this sort of biased journalism hard to swallow.

I certainly have no intentions of defending the whole of contract programming as without fault; I know better. But then neither do I feel that several paragraphs of condemnation are adequately balanced by one brief paragraph of approbation.

I think that even Al Strong would allow that contract programming fills a need and provides a service. The point of contention seems to be whether, or how well, we accomplish our task.

At the risk of being accused of an elitist attitude, I would have to agree with Stuart Magie that most of the people whom I have met as contract programmers have been either extremely well qualified or out-and-out "kooks." Without exception, I have found the larger middle ground to be safely ensconced as "direct" employees. I would venture to suggest that it takes a somewhat different breed to accept the challenges and to provide the services required of contract programmers.

Two other accusations in the article seem to me to be another pair of our strong points turned inside out: The idea that we are job-hoppers, unable to keep a decent full-time job, is perhaps true in a few cases but patently ludicrous in most. Where did we get this vast array of experience that enables us to step into a job at a moment's notice and perform productive work? Certainly it wasn't by sitting contentedly at one job with one company for all those years, doing essentially the same work day after day.

The second item is that we are disconnected, and by implication disloyal, to the company for whom we are currently performing a task. In my mind, this position allows us to take a more objective view of the task at hand. We are isolated from company politics and our fate does not depend upon hitching our wagon to the currently rising star in the company's firmament. We are able to view the current project with regard to its technical requirements only.

Joseph W. Chambers
Lynn Haven, Fla.

Touch of Humor

"Managers Warned of Contract Programmers" provided a rare touch of humor for your readers. According to the article, Al Strong claims that, "Unlike programmers who work permanently for one company, most self-employed free-lancers seldom develop a strong sense of loyalty for the users to whom they sell their services."

As everyone in data processing except Strong knows, most salaried programmers are neither loyal to their employers nor are they "permanently" employed. Articles deploring the high turnover rate appear frequently in *Computerworld* and other trade publications.

On the contrary, a free-lancer is strongly motivated to build a long-term relationship with a customer. It is usually more difficult, more expensive and more damaging to his reputation for him to change customers than it is for a regular employee to change jobs.

Richard Mautner
New York, N.Y.

Moved to Protest

I appreciate *Computerworld*'s weekly arrival. It provides me with information on new products, legal precedents, market trends and the like which are unavailable from any other single source. I am moved to protest, then, when I see this source stray from its normal self-policing of material.

I refer specifically to the recent article on contract programmers. As in most industries, people who work in ours range through good, bad and indifferent. This is true in all areas of job performance, including programming, documentation, loyalty, job longevity and so forth. It is true for regular staff, contractors placed through agencies and self-employed contractors. It is the job of a personnel manager to develop a work force high in the positive qualities and low in the negative.

It is also self-evident that one can emphasize one set of qualities over another, or one group over another, in order to serve one's own ends — and with little regard to objective evaluation. Was any reader surprised to learn that the president of a "contract services firm" should issue warnings against self-employed contractors?

George Koch
San Francisco, Calif.

Will your retirement home be near some mountain greenery, or farther south within the Sun Belt, or on the shores of the Pacific? Aramco's big bundle of benefits will help you secure it sooner than you think. See below.

All your medical needs are free while you are in Saudi Arabia — even your prescriptions.

Unlike medical care, dental care is not free for Aramco employees. However, the costs are comparable to what you'd expect to pay back home.

A chance to save huge sums of retirement money

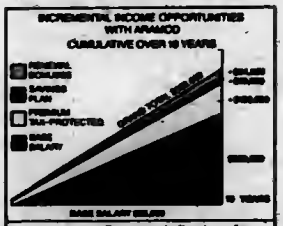
We can only give you a bare idea of how the money can multiply over a 10-year span. For the sake of illustration, let's add up the fortunes of an engineer working for Aramco in Saudi Arabia making $35,000 U.S. in base pay, with no raises for the 10 years (not likely!). Remember this is just a hypothesis.

Right off, you see that our imaginary engineer in Saudi Arabia can gross around $183,000 more. The amount saved out of that grand total is strictly up to the individual.

But look at that $130,000 premium. Whatever the dollars work out to in your case, please remember that this is the bundle which is *totally* tax-protected.

This graph doesn't show what you save on medical expenses, it doesn't show the allowances on your children's education, it doesn't show the travel allowances which cut down on vacation costs, it doesn't show the retirement benefits you may accumulate.

What it does show is that you have the chance of a lifetime to save a really important amount of money.



This is not an offer or an indication of wage scales. It is merely a hypothetical example of how your gross income can accumulate dramatically when you work for Aramco in Saudi Arabia. Employees are not fully vested in the savings plan until 60 months of continuous service. All projections subject to change.

A sensible way to check out the new lifestyle

Everyone in Saudi Arabia lives within the letter of the local law. (No alcohol, for instance.)

But the Americans and Canadians eat steak and french fries, they go golfing and sailing and water-skiing, they tend their nice suburban houses.

While the lifestyle is easy, sometimes living so far away from relatives and friends can be difficult for some. That's why we've begun a new policy. The Aramco overseas tryout.

If you don't want to move your whole family over at once, come and work for us on bachelor status for one year. We'll fly you home three times so you can keep the family informed about your adjustment to life in Saudi Arabia. Then at year's end or sooner all of you can decide whether the life is for you or not.

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Aramco is the world's largest oil-producing company. So the job opportunities for experienced engineers are boundless. You can stay within your specialty — or you can expand into new territories.

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THE TAYLOR REPORT/Alan Taylor

Foul-Up Shows Abuse of Redundant Data

A recent error in a reader's subscription renewal form for the magazine *Arizona Highways* shows that a good system of redundant information can be subject to design abuses.

The facts are simple. The Zip Code for a Chatham, Mass., resident was entered incorrectly into an address book. In a transposition error, the 2 and the 6 were transposed to give the Zip Code 06233 instead of 02633. This type of error would be caught by any check-digit system — if Zip Codes were designed to be used independently of other information.

The wrong 06233 Zip Code, with the right address, was then used to order a gift subscription to *Arizona Highways*. The magazine never arrived at the right address because somewhere in *Arizona Highways'* system the Zip Code was used in preference to the town and state identification in the original order. As a result of the normal and anticipatable error, the magazine was sent to Ballouville in Connecticut, rather than to Chatham in Massachusetts!

It appears, from the details *Arizona Highways* now gives, that its computerized system does not in fact check the original town and state, but simply uses a table lookup based upon the Zip Code. If, as in this case, the magazine is not returned, no action is taken.

Abuse of Redundancy

This is not a very important matter, on the surface. But still it is one which, in some form, should be part of any system designer's education — and elementary education at that.

The *Arizona Highways* system is clearly at fault in at least three ways. (I suspect that there may be more system faults here, but three will do.) And, while in this instance the subject matter is not that important — a $12 subscription — such faults can be uncorrected indefinitely in other computerized systems as well.

The first fault, chronologically, comes in the data input system. The actual input is ignored! The actual instructions of the input originator are never fully carried out.

No system should ignore input data. The data may be discarded after input and checking, but it certainly should not be ignored. Even if, as will be the case in this particular application, the actual town and state information is often in error (can you think of how many variations of Ballouville will occur?), the input must be input. That's elementary, and that was mistake number one.

The reason the input was ignored is that in the mailing address case, as in many systems nowadays, a possible, definite address can be obtained from only part of the input. The designer accepted as the design goal producing *an* address, without concern as to whether it was the correct address.

Items like Zip Codes are error-prone. Transposition, transcription and other errors can and do occur without obvious format problems in any nonprotected numeric strings, even short five-digit ones.

Any system designer knows that check digits can protect the accuracy of such number codes, but apparently the corollary has not been understood. If check-digited numbers can be used, then presumably it is dangerous to use noncheck-digited numbers. And this is what the *Arizona Highways* designer has done. The Zip Code has been used without protection. So that is error number two.

The third error, which may well be the cause of the others, is that the system confuses input with production.

In the production of an address, table-identified town/state printing is perfectly all right. Once the correct Zip Code is in the address, there is no need to hold the individual address lines in a redundant form. Redundancy and redundant checking are needed in input, not during production.

The quite common system fault that seems to have happened here is that the production standard of not needing the town/state data has been carried too far into the system and has been used in the input area.

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CCP

The annual examination for the Certificate in Computer Programming (CCP) will be held on December 13, 1980, at selected test centers throughout the world.

Specific requirements for this year's examination are detailed in the "Certificate in Computer Programming Examination Announcement and Study Guide." The study guide and application form for the 1980 examination are available on request from ICCP.

Please forward the "Certificate in Computer Programming Examination Announcement and Study Guide" along with application and test site list.

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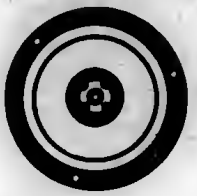

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Special to CW

Perhaps the best way to document systems developed using the top-down approach is from the bottom up.

The top-down approach first involves determining a general overall concept with certain applications and reports in mind. Second, system and subsystem designs are developed. Third, master files of information are outlined and program specifications are written. Finally, the programs are coded and the system is tested and implemented.

Several people were involved in the development of this system, but now there is only one person left to document it — you. And you may not have a full understanding of this system nor may anyone else remaining from the original project team. So how can you document and develop the system's manual efficiently and still maintain a low level of frustration?

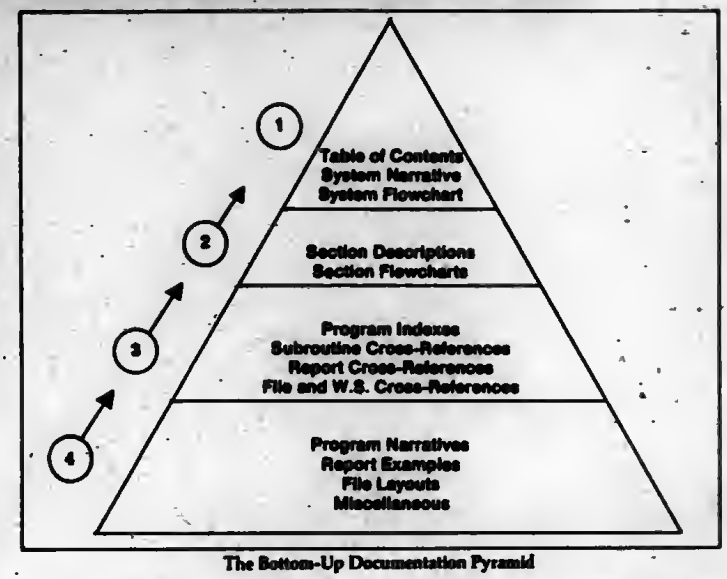
Common-Sense Steps

While there are no magic formulas, there are some basic common-sense steps which, if followed, should prove helpful. These steps form what is called "bottom-up documentation," so named because it resembles going through the development steps in reverse.

With this approach, the first level of documentation — or ground-level detail development — includes the following steps:

- Collect all existing documentation. Begin to find out what has been done, what has not been done and what is incomplete. At this point, do not change or delete any existing documentation since not enough is yet known to be able to tell if it is correct or incorrect. When more is learned about the system, you can add to the incomplete and alter the incorrect.
- Assemble all the report examples. To do this, you may have to inventory the reports from the programs.
- Inventory the program numbers through the following procedure: List the program numbers first from the source librarian, next from the vault index and finally from the existing documentation.
- Determine what programs are missing from these three sources.
- Write the program and subrouting narratives, explaining the complex processing where required.
- Assemble the file layouts and the working storage including name layouts.
- Assemble all available miscellaneous information from the existing documentation

(Continued on Page 48)



The Bottom-Up Documentation Pyramid

VAX Gains Modeling Language

PALO ALTO, Calif. — A financial modeling language and an interactive data base management system DBMS for users of the Digital Equipment Corp. VAX-11/780 have been announced by Ross Systems, Inc. While both products were developed originally for the PDP-11 under RSTS/E, the VAX versions are said to be 100%- compatible with the PDP-11 versions, while exhibiting enhanced capabilities.

Maps, the financial modeling and reporting language, uses the virtual address facility of the VAX to manipulate large reporting and consolidation matrices. In addition, financial data bases and reports can be stored and manipulated, according to the vendor.

Intac, the interactive DBMS, utilizes the rapid compilation and execution times of VAX Basic for execution of both its report program generator and its screen formatter/transaction input program generator, the firm said.

Maps and Intac cost $20,000 each for a one-time license fee, or $1,000/mo under lease, with 50% of thet monthly price applicable toward a one-time license at any time, a spokesman said. Ross Systems is headquartered at Suite 208, 1900 Embarcadero Road, Palo Alto, Calif. 94303.

'Softool 80' Backs Development

GOLETA, Calif. — Softool 80, a set of tools for software management, development and maintenance, is available from Softool Corp. The product consists of an integrated collection of software tools thet are hosted on a conventional computer system to create a software development and control facility.

Softool 80 supports an explicit distinction between the host environment, where software is developed and controlled, and the target environment, where programs are executed, the vendor claimed.

Release 1.1 features short-hand language, structured languages, source code auditor, error detectors, libraries of prefabricated code, testing aids, tracing aids, optimizers, dynamic memory managers, tutorials and interface language, a spokesman said.

Release 1.1 can be obtained off-the-shelf for IBM 370, Digital Equipment Corp. and Data General Corp. computers.

The product is priced between $2,500 and $60,000 depending on the number of tools procured, the vendor said from 340 S. Kellogg Ave., Goleta, Calif. 93017.

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Manufacturing Control Geared to Univac Processors

BLUE BELL, Pa. — A data base-oriented interactive manufacturing control system for use with Univac System 80, 90/30 and 90/40 systems has been announced by the firm.

Unis 80, reportedly usable by non-DP personnel, is said to provide a built-in capability for integrating data, data base management control, data security and recovery and interactive updating of data. Those features are provided by the OS/3 Codasyl standard data base management system DMS, according to the vendor.

The Unis 80 approach is to provide a closed-loop manufacturing system and let the manufacturer choose all or part of the system, a spokesmand said.

The closed-loop system assists in all phases of manufacturing from order processing and inventory status and control to master scheduling and purchase and work order control.

All transactions are entered through terminals, validated and processed immediately into the data base, according to the firm.

The minimum hardware configuration required to support Unis 80 is a System 80 with 524K bytes of main storage, two disk units, one workstation or Uniscope 200/UTS 400 terminal, one printer and one diskette unit.

The minimum 90/30 and 90/40 hardware configuration for Unis 80 is 524K bytes of main storage, expanded control memory, two disk units, one workstation or U200/UTS400, one printer and one diskette unit or magnetic tape unit.

With first customer deliveries scheduled for December, the minimum System 80 hardware configuration is priced at $67,325 or $1,884/mo on a five-year lease. The software license fee is $500/mo including support.

Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

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Service Analysis Meet Set

PRINCETON, N.J. — "Data Administration and Data Dictionary", and "Service Analysis" are the two seminars featured at the first annual Service Analysis User Group Conference organized by the Performance Development Corp. (PDC). Offered in two locations — New York on Sept. 26-27 and San Francisco on Oct. 24-25 — the conference is aimed at current and potential service analysis users.

The "Data Administration" session is intended for DP management, project leaders, senior application designers, lead programmers and business analysts who desire a better understanding of application systems for both data base and non-data base applications.

Registration is $495 per seminar, $875 for both. Each additional company enrollee receives a $75 discount. Details and hotel reservations (not included in registration fees) are available from PDC, Building P, 1101 State Road, Princeton, N.J. 08540.

Bottom-Up Method Advised

(Continued from Page 47)

into one pile.

At this first level, you learn many details about the system, but it is at the second level that you start to organize this information into logical sections. Level 2 steps involve the following:

- Establish logical sections of documentation allowing a minimum amount of duplication from section to section. Remember, this is not a user manual developed with the user in mind and organized by applications.
- Write the program index for each section including the program number and description. List in alphanumeric order, matching the same order as the program narratives.
- Draw the subroutine cross-reference for each section. Set up the calling program numbers down the left side of the page and the called subroutine numbers across the top. Mark an "X" where the row and column intersect connecting the two.
- Write the report cross-references for each section, including the name of the report, report number, print program number and data-extract program number.
- Draw the file cross-references for each section. Set up the files across the top of the page and the program numbers down the left side. Mark an "X" where the row and column of the two intersect.
- Draw the working storage include Name cross-references for each section. Set up the include names across the top of the page and the program numbers down the left side. Mark an "X" where the row and column of the two intersect.

Third-Level

Steps involved in the third level of documentation — section logic and summary — are as follows:

- Draw the section flowcharts. By now you should have a good idea of the logical makeup of each section. The section flowchart should contain every program, every file and every report included in that section. The subroutine cross-reference, the file and Include Name cross-reference and the report cross-reference will provide much of the information needed to develop a good flowchart for each section.
- Write the section descriptions. The section flowcharts and the other sectional documentation already prepared should aid greatly in writing the section description summaries.

The fourth level of documentation — system logic and summary — involves the following procedure:

- Draw the system flowchart. Now that you have completed the section flowcharts and the section summaries, you should have a good idea of how all the sections together contribute to the logic of the total system.
- Write the system narrative. Using the system flowchart just developed and the section summaries, summarize and write the system narrative.
- Write the table of contents and glossary.

Now comes the review stage. At this point, assemble the review team for an overall look at the rough draft of the documentation. Each member of the review team should take one section of the documentation — preferably the one that he is most familiar with — and review it in depth.

Review each section individually with the team member responsible for that section and address the member's question list as well as the question list you put together on this section. The review team should then be reassembled to review all additions, changes and deletions to each section.

The final product should be presented to and critiqued by the review team before being distributed to management and staff members for use.

Harding is director of computer services for Agrimetrics Associates, a Richmond, Va., firm specializing in measuring cost and performance.

CICS Users:
AXIOS Knows the ROPES
When It Comes To Online Printing

Productivity Tool Aids TSO-Based Programs

SAN FRANCISCO — A programmer productivity tool for IBM Time Sharing Option (TSO)-based application programs is available from Diversified Programming Services.

Saint is a screen maintenance and mapping program that is said to allow programmers to design, develop, test and update screen and print images directly from an IBM 3270-type CRT terminal.

The package reportedly allows users to define their own screens, and permits the development team to prototype the system without coding a single line of code.

In addition, Saint is said to decrease the time required to create and maintain 3270 screens from days to hours.

All screen and print images are stored by name and thus can be retrieved by utilizing the "get screen" facility of Saint, according to the vendor. Because Saint automatically generates copy code of the screen or print images, coding errors in these image descriptions are eliminated, the firm claimed.

Saint includes a mapping subroutine that allows an application program to map data fields to and from a 3270 without elements such as macros and assemblies.

Under TSO, the mapping and terminal functions have been combined into a single CALL to retrieve screens, placing them in character areas and returning control to application programs.

Saint is available on a free 30-day trial evaluation license. The one-time license fee is $12,500, with lease plans available from the firm at 85 Sotelo Ave., San Francisco, Calif. 94116.

Unix Version 7 Adapted By Xenix for 16-Bit Micros

BELLEVUE, Wash. — Microsoft is offering for 16-bit microprocessors Xenix, an adaptation of the Version 7 Unix operating system from Bell Laboratories.

Xenix is an interactive, multiuser, multitasking operating system that will run on advanced microcomputers including Intel Corp.'s 8086, Zilog, Inc.'s Z8000 and Motorola Corp.'s M68000 as well as Digital Equipment Corp. PDP-11 minicomputers, the vendor said.

All existing Microsoft system software — including Cobol, Pascal, Basic and DBMS — will be adapted to run under Xenix. All software compatible with the Unix operating system will also run under Xenix, the vendor noted.

Written in the C programming language, the operating system is said to be easily transportable to different microprocessors.

Xenix will be available in October and costs between $2,000 and $9,000 depending on the number of users, the vendor said from Suite 819, 10800 N.E. Eighth, Bellevue, Wash. 98004.

System/34 Gets Menu Enhancer, Display Packages

LUDLOW, Mass. — A menu enhancer introduced by Computer Technologies, Inc. reportedly allows users of IBM's System/34 to modify items on standard menus to highlight, reverse image, underscore, blink or a combination of the above.

The package is being offered for $350, with full documentation.

In addition, Computer Technologies is offering a line of packages to display customer open items for accounts receivable, a display of customers by selected last name and a combination of these two items.

The combination allows the user to enter a last name, or part of a last name, display all customers with the selected name and then display a selected account for receivable information.

The open item display costs $1,200, the name search, $500. The combined display is priced at $1,850.

Computer Technologies can be reached at P.O. Box 259, Ludlow, Mass. 01056.

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The SHRINK/2 file compression systems reduce the volume of data on disks and tapes by as much as 80% for users of OS 360/370 and compatible systems.

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'Safer' Eases Student Aid On HP 3000s

GAITHERSBURG, Md. — Several software packages designed to facilitate student financial aid determination and processing for Hewlett-Packard Co. 3000 computer users are available from College Student Financial Aid Services, Inc. (CSFAS).

The Student Aid Financial Evaluation and Recordkeeping (Safer) system is aimed at financial aid processing for institutions of higher learning. Cost for the package is $7,500.

The Student Online Output for Needs Evaluation and Recordkeeping (Sooner) software computes the estimated financial need and BEOG index for a potential college student directly from his Financial Aid Form. Sooner costs $1,000.

College Assistance for Students in Higher Education (Cashe) is a College Scholarship Search service geared specifically to students in Maryland, Virginia and the District of Columbia. The search, costing $35, is said to include many local scholarships not typically included in national searches.

CSFAS is located at Suite 208, 16220 S. Frederick Road, Gaithersburg, Md. 20760.

Service Assists Auto Dealers

DAYTON, Ohio — Reynolds and Reynolds Co. is offering a service to give auto dealerships information processing control of accounting and parts inventory functions.

The TC 1000/dealer management system offers remote intelligent processing. The dealer's transactions are entered through Reynolds' TC 1000 terminal and transmitted via telephone lines to Reynolds' regional processing center. The transactions are processed into reports and transmitted back through the terminal, the vendor said.

Reynolds will either lease or sell terminals to users. The minimum monthly charge is about $200 for the accounting service and $250 for the parts service, the vendor said. It can be reached at P.O. Box 1005, Dayton, Ohio 45401.

Library System Targets Health Science Users

SPRINGFIELD, Va. — An Integrated Library System (ILS) aimed at health science libraries but usable by any library has been developed by the National Technical Information Service (NTIS) of the U.S. Department of Commerce.

Designed for Digital Equipment Corp. PDP-11, Data General Corp. Eclipse and IBM Series/1 minicomputers, the ILS software runs under Cambridge, Mass.-based Meditech, Inc.'s Meditech Interpretive Information System operating system.

ILS includes a Master Bibliographic File (MBF) that supports all functions — circulation, serials control, acquisitions, cataloging and authority files — and a circulation subsystem that indicates the status of any item.

The ILS package No. PB80-202658 costs $2,000 from 5285 Port Royal Road, Springfield, Va. 22161.

At INCO,

ADABAS

Inco's DBA tells why ADABAS, Software AG's data base management system, was chosen for the expanding needs of this international firm.

"Five years ago, we chose ADABAS from Software AG as our data base management system. We demanded a highly flexible, end-user oriented DBMS that would facilitate the development and operation of our business systems. We did not have the time to design our own DBMS, or the luxury of selecting a system that would require a large staff to implement and support. We needed an easy-to-use package with the design phase already accomplished. The available studies indicated to us that ADABAS would be the best choice for our needs. Five years of experience showed us that the studies were right – and so were we in choosing ADABAS."

Exceptional flexibility, easy maintenance

"During the development stages of our many application systems, the specifications often changed. We were constantly adding fields and files, or changing their locations in the data base. With ADABAS, these changes are very simple to make. There are no cumbersome chain pointers, so relationships can change according to need.

"In fact, we are continuing to modify our systems to meet our expanding corporate requirements. And with ADABAS, we can make these necessary changes with little or no impact on the hundreds of batch and online programs supported by the DBMS."

Cost-effective new program development

"In planning new applications, we do not have to include the high cost overhead for restart/recovery, security, or data base

we demand adaptability and ease-of-use in our DBMS delivers!

Michael Berman, Corporate Data Base Administrator

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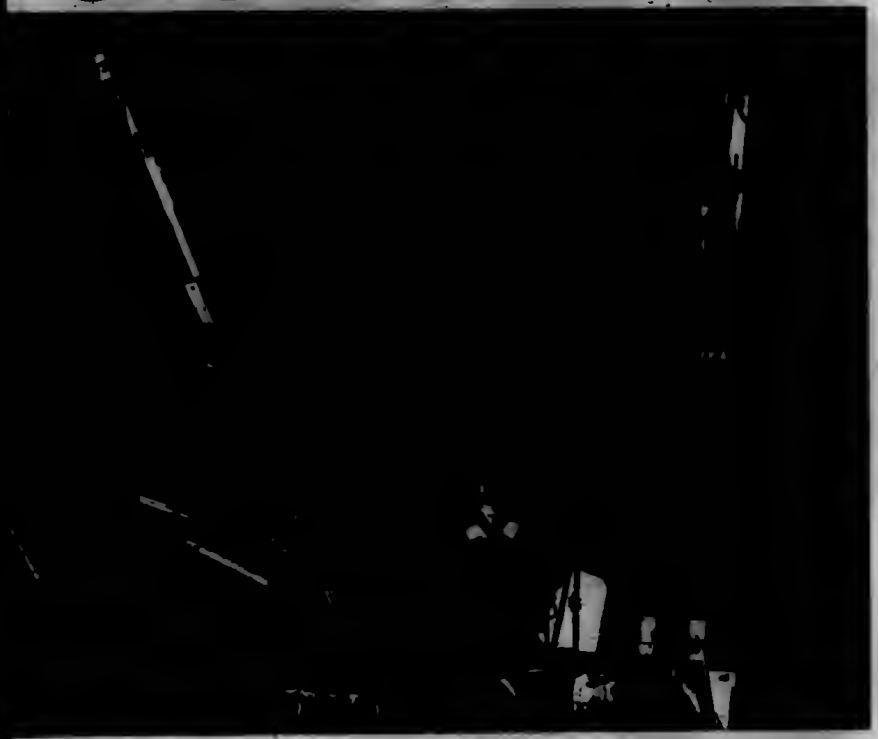

ADABAS: Datapro Honor Roll winner for three years

At Inco, ADABAS has cut both program development time and cost. In fact, the exceptional ease-of-use of ADABAS, combined with its outstanding throughput efficiency and adaptability, helped give this product such a high user rating that ADABAS has been nominated to the Datapro Honor Roll for three consecutive years.

If you'd like to know more about how ADABAS met Inco's demand for a truly adaptable DBMS, send for Software AG's ONLINE report today. You may find that ADABAS is the ideal data base management system for a demanding company like yours, too.

loading. These utilities are all included in ADABAS already. Applications programming is faster and easier, too – because ADABAS provides the tools. This means we can concentrate on the application problem – not the data base.

"ADABAS gave us a powerful end-user query language – ADASCRIPT+, an interactive report generator – ADACOM, and an online Data Dictionary all in the same package. And recently we have added NATURAL, Software AG's instant applications language, which we expect will decrease development time. Furthermore, the ADABAS system can be fully installed in a single day!"

High company-wide productivity

"ADABAS is up and running at Inco 18 to 20 hours every working day. The system is used daily by literally hundreds of end users and programmers alike. Each day, our New York installation processes more than 400,000 data base commands from departments like accounting, personnel, marketing, customer information, shipping and billing. With all this intense activity, ADABAS is supported by only three people: a data base administrator, a data base analyst, and a data dictionary analyst."

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'UCC One' Tape Manager Updated

DALLAS — University Computing Co. (UCC) has announced an upgraded version of its UCC One tape management software that it said contains a user-restricting security interface and a facility to aid combining or splitting tape libraries or tape management data bases.

Version 4.6 includes support for IBM's system modification program (SMP) 4, allowing users to perform system maintenance using either Superzap, SMP 3 or SMP 4, a spokesman said. The system maintenance utility has also been enhanced to automate the selection and installation of the data management interfaces.

The key aspect of the upgrade is the version's Inquiry/Update function which now has a security interface that prevents users from performing certain functions and, in the case of updating, prohibits them from modifying specific fields in the UCC One data base. When centralizing or decentralizing computer operations, the upgraded package is said to also aid in pulling together or splitting tape libraries.

The UCC One software costs $15,200 from UCC at UCC Tower, Exchange Park, Dallas, Texas 75235.

Free Electronic Magazine Offered for PDP-11 Users

NORCROSS, Ga. — Digital Publications, Inc. has launched an electronic magazine and software-buying service for Digital Equipment Corp. PDP-11 users that offers free information, a software buying co-op, hardware and software product reviews and other user-oriented features.

The 24-hour *Digital Digest* magazine is free and can be accessed via a terminal and 300 bit/sec modem set up for seven data bits, even parity and one stop bit. Basically, the magazine offers an electronic mailbox, a continually updated bibliography of computer-related articles and publications, a reader comments section, an up-to-date listing of the latest DEC products or DEC-related gear, a product review section and a guest editorial column.

For an additional $75, participants can subscribe to the "Digital Exchange," a feature of the magazine that allows users to select and buy needed software at current market values.

If, however, the participant is also a software contributor who submits software to the listing for sale, that subscription is free.

The contributor also receives software-exchange credits for the software in the amount of 1.5 times the average market value. These credits can be used toward the purchase of other software products listed in the Exchange.

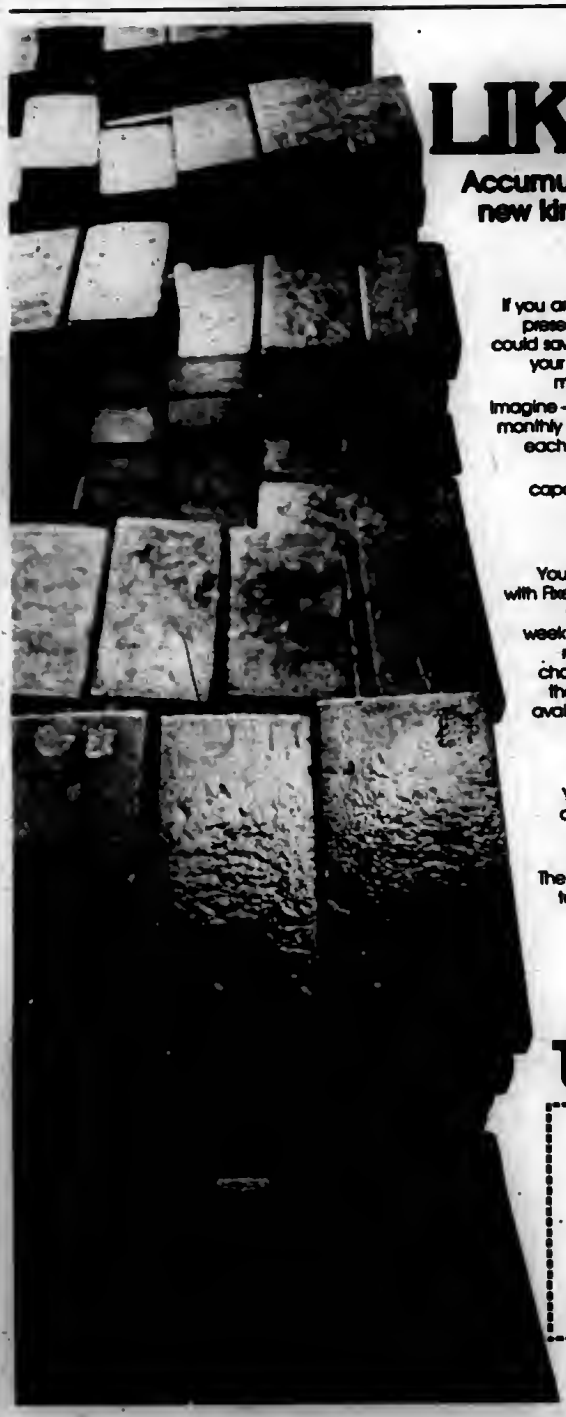
For an additional $75, users can join the magazine's Digital Buying Group which offers members the benefits of cooperative software purchases.

Software offered by the buying group is geared for DEC RL01, RL02, RK05, RU58, floppy disk and magnetic tape media.

While the electronic version of the magazine is free, a printed monthly synopsis can be obtained for $15 per year. In addition, memberships in both the noncontributing Digital Exchange and Digital Buying Group can be bought for $125, rather than the usual $75 each initial fee.

Although the service is currently limited to DEC users, the company is presently planning to expand it to users of Data General Corp. gear.

Additional information on the service is available from Digital Publications at 1101 Noble Forest Drive, Norcross, Ga. 30092.



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Directory Gives On-Line Listings

SANTA MONICA, Calif. — The "Directory of On-Line Databases" describes all the major on-line bibliographic and nonbibliographic data bases that are publicly available on an international basis through telecommunications networks.

The reference tool, updated quarterly, includes 550 indexed listings.

Yearly subscription rates are $60 within the U.S., $66 in Canada and Mexico and $72 for all other countries. It is available from Cuandra Associates, Inc., 1523 Sixth St., Santa Monica, Calif. 90401.

Two Utilities for Series/1 Revised

ORINDA, N.Y. — Enchanced versions of EDXREF and EDXDMP, utility programs designed to shorten IBM Series/1 application development time and reduce program maintenance efforts, are available from Legler Systems Co.

The Disk Record Dump (EDXDMP) program has been expanded to include a "FIND" capability where all records in a file can be selected by the user specifying a binary data value or character string that is used to select records to print, a spokesman said, adding that disk and diskette records can be printed by specifying a relative record number.

The Cross-Reference Dictionary (EDXREF) program prints a stored listing of where all data names and labels are used in EDL source programs. The new version can be initiated from a stored procedure automatically, whenever the source program is recompiled, the spokesman added.

Both programs run under the EDX supervisor on any IBM Series/1 processor with a CRT terminal or system printer, he claimed.

They are available for a one-time charge of $95, the vendor said from 23 Charles Hill Road, Orinda, Calif. 94563.

Isam Capability Provided To Fortran Programmers

MANHATTAN BEACH, Calif. — A disk-based file management system that provides an indexed sequential access method (Isam) file capability for Fortran programmers has been announced by Syscon Design, Inc. Available for users of Digital Equipment Corp. PDP-11 minicomputers using the RT-11, RSX-11M or IAS operating systems, the FMX package supports random, sequential, reverse sequential and mixed access modes.

FMX provides random access by matching the key field of a record with that provided by the user, according to the vendor.

The package provides sequential access by maintaining data records in doubly-linked lists, eliminating the need for file restructuring when records are added to or deleted from the middle of a file, a company spokesman said.

FMX is available for a one-time license fee of $14,500, including object code, from the firm at Suite F, 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

J.C. Penney to Host Focus Users Meeting

NEW YORK — Fuse, the newly organized Focus users group, has completed plans to hold a two-day conference here Oct. 6-7 hosted by J.C. Penney. Keynoting the event will be Dan Walkovitz, president of Corporate Management Systems, Inc., who will speak on "Effective In-House Time-Sharing — Fact of Fancy?"

Focus is the data base management system from Information Builders, Inc.

The meeting is open to all Focus users and potential users. Registration for the conference costs $45. More information is available from Bobbi Feldman at Information Builders, Inc., 1250 Broadway, New York, N.Y. 10001.

MIS to Hold IBM Seminars

FRAMINGHAM, Mass. — MIS Associates is offering three three-day seminar programs on auditing IBM's OS/VS, DOS/VS and MVS operating systems.

MIS will hold "Auditing OS/VS" in San Francisco, Oct. 6-8 and again in Phoenix, Dec. 1-3. "Auditing DOS/VS" will be hold in Boston, Oct. 15-17 and Dec. 1-3 in Chicago. "Auditing MVS" is scheduled for Sept. 24-26 in San Francisco, Oct. 13-15 in Philadelphia and Nov. 12-4 in Chicago.

Each seminar costs $465, MIS Associates said from 12 Juniper Lane, Framingham, Mass. 01701.

DOS/VS Terminal Printer Spooling

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Used by operators or programmers to review DOS/VS messages via CICS* without tying up system console. $720 or $36/mo.

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Vought Corporation, [illegible] subsidiary of Ling-Temco-Vought, Inc., [illegible] company which builds military aircraft, missiles and space systems and commercial aircraft components.

Bobby Harper, Vought's Manager of Information Services, recently discussed their use of EXECUCOM's Interactive Financial Planning System (IFPS).

"IFPS was chosen by Vought Corporation in 1975 as our first venture into the area of Decision Support Systems. Comparative studies of products existing at that time proved IFPS to be the only one with a current set of superior capabilities plus unlimited expansion possibilities," he said.

"IFPS has proven itself in [illegible] support of management in providing timely response to management questions that otherwise would have remained unanswered in the time frame allotted. Applications have been most prominent in the financial areas. However, many significant uses are found in manufacturing, materials, and engineering," he noted.

Uses at Vought include debt planning, debt management, treasury operations, consolidation of balance sheet and income statements, transportation, facilities, and engineering planning and forecasting.

He continued, "Answers to critical questions that once were not available may now be researched in a reasonable time. Analysis of data that required production programs and unacceptable lead time to compose routines may now be obtained in time for decision-making department heads to use it."

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Dibol Report Writer Fits DEC Operating Systems

TAHOE CITY, Calif. — A Dibol report writer that runs under Digital Equipment Corp.'s RT-11, RSTS/E, CTS 300, CTS 500 DBL and TSX operating systems is available from ABC Computers, Inc.

The report writer is said to be capable of creating any type of report from Dibol data files or from Isam files.

The report writer costs $2,000. ABC is also offering versions of the package that are integrated with its job cost accounting package for accounts receivable, accounts payable, order entry/inventory, general ledger and payroll, the vendor said from P.O. Box 7529, 500 Tonopah, Tahoe City, Calif. 95730.

Cuts Development Time

Screen Utility Aids IMS/VS Work

NEW YORK — MFSGEN, an interactive screen formatting utility said to reduce IMS/VS on-line applications development time, is available from PFK Systems, Inc.

The package generates the IFS and application program source code necessary to format, identify and route messages, the vendor claimed.

It also reduces errors, frees programmers to concentrate on application-specific logic and eliminates much of the need for special MFS and IMS DC expertise, the vendor said.

Batch or On-Line

The product may be obtained in batch and interactive versions. The interactive version runs as an IMS DC application on any system including 3270-compatible devices.

The batch version costs $3,200 and the interactive version, $4,000. A tutorial guide is available separately for $300, the vendor said from 120 Wall St., New York, N.Y. 10005.

'Rabbit-4' Protects RSTS/E Files

WEST PALM BEACH, Fla. — A stand-alone data file security system that operates under Digital Equipment Corp.'s RSTS/E Version 7 operating system is available from Rasco, Inc.

Rabbit-4 prevents access to classified or confidential data files by unauthorized personnel and even privileged users, the vendor claimed.

The system logs all attempted file violations and makes them available for analysis. In addition, computer operations and security management may be immediately notified of the file violation attempt, and the offending job is rolled out and killed.

The RSTS operating system may also be disabled until the intrusion is cleared.

Six Security Levels

The system provides up to six levels of security on a present maximum of 64 data files.

Up to 32 wild-card notations define the authorized users for each secured file.

Rabbit-4 is available through a permanent license for $2,500 or rental program for $99 a month, the vendor said from 3336 N. Flagler Drive, West Palm Beach, Fla. 33407.

'System-80' Available To TI Users

PITTSBURGH, Pa. — System-80, the on-line Cobol program generation system from Phoenix Systems, Inc., has been made available to users of Texas Instrument, Inc. computers.

System-80 works off of key words in a data dictionary to produce Ansi '74 Cobol code to perform whatever functions are necessary in a program.

The typical program in any application should take no more than 20 minutes to write, Phoenix Systems claimed.

The full System-80 is available to TI users for a one-time cost of $12,675. Functional modules of System-80 start at $1,625.

Phoenix Systems can be reached at P.O. Box 7849, Pittsburgh, Pa. 15215.

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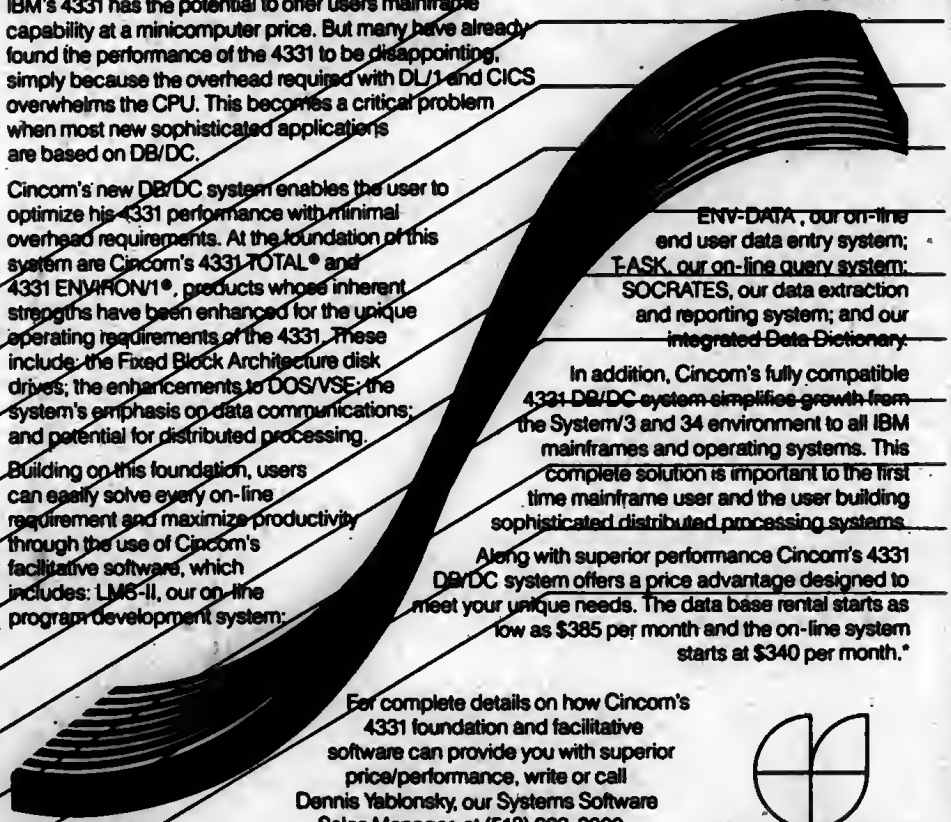

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*These prices apply only to the U.S. and Canada.

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Fate Rests With FCC

Two-Way Microwave Link: Race Is On

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The weakest link in most data communications systems is the analog local loop connecting the user to a carrier's network. Replacing the analog circuit with a microwave link could improve throughput considerably in many cases.

Until recently, however, there's been a hitch in that solution: While microwave facilities are available in a number of U.S. cities, they cannot be used for two-way data communications applications.

That situation now appears to be changing. Xerox Corp. last year proposed using broadband microwave to support its Xerox Telecommunications Network (Xten) electronic message system.

Early this year, Satellite Business Systems (SBS) indicated it has plans to do basically the same thing, starting early next year with a transcontinental data communications demonstration utilizing a combination of satellite inter-city transmission facilities connected to cable and/or microwave local loops in New York and San Francisco.

And last month, Tymshare, Inc., one of the participants in the forthcoming SBS demonstration, acquired Microband Corp., which operates microwave-based multipoint distribution systems in about 75 U.S. cities [CW, Sept. 1].

UP to FCC

None of these efforts will help data communications users, however, without some action from the Federal Communications Commission (FCC). Basically, the problem is that the commission's present rules limit multipoint distribution systems to one-way-only services.

Typically, these systems deliver commercial TV programs to local community antenna television (CATV) networks. The program is collected at the local termination of an intercity satellite or terrestrial broadband circuit, transmitted by cable or microwave to a multipoint distribution system transmitter and then sent over the air to one or more local CATV nets.

More often, the operator of the multipoint distribution system broadcasts directly to the viewer, who receives the program via a rooftop antenna.

Several months ago, the commission proposed a number of

(Continued on Page 56)

Technique Connects Devices For Local-Area Networks

The Mitre-developed and licensed Bus Interface Unit permits terminals and a variety of other peripheral devices to be connected on a CATV coaxial-cable system to form high-speed local-area networks for such applications as office automation and process control.

BEDFORD, Mass. — A patented digital communications technique that offers connectivity of dissimilar digital devices with low bit-error rates as well as high transmission speeds has been licensed for commercial application.

Such devices as terminals, printers, word and data processors can be connected on a community antenna television (CATV) coaxial cable system using bus interface units employing the new technique. These elements constitute high-speed local-area networking systems that have application in such fields as office automation and process control.

The Mitre Corp. here, which developed and patented the new technique, signed the licensing agreement with Digital Communications Corp. (DCC) of Germantown, Md. DCC, a subsidiary of M/A-COM, has already begun production of an interface unit making use of the licensed technique.

The technique involves operation of a common-channel digital-bus communications system in a carrier-sense multiple-access mode, employing a collision detection feature. The system can accommodate hundreds of connected subscriber devices. The underlying patent was awarded to Gregory T. Hopkins and Paul E. Wagner, both of Mitre.

System Combines Modem And Statistical Multiplexer

ROCHELLE PARK, N.J. — A data transmission system that combines the Timeplex, Inc. Series II Microplexer statistical multiplexer and a 9,600 bit/sec modem into a single package has been announced by the firm. The Microplexer Transmission System (MTS-11) is said to provide "greater economy and convenience" in statistical multiplexing of up to eight asynchronous or synchronous channels.

It also reportedly permits parameter programming on a per-channel basis so that many different types of terminals, printers and other peripheral devices can share a single telephone line.

A supervisory port option provides operating statistics that allow monitoring of network performance, according to the vendor. The MTS-1 provides "complete compatibility" for local and remote diagnostics at both the channel and data link levels, a company spokesman said.

The unit features functional displays and fallback to 4,800 bit/sec in the event telephone line degradation prevents operation at higher rates. The system is available in 4- and 8-channel configurations.

The Timeplex Series II microplexer, introduced last year, is a family of microprocessor-controlled statistical multiplexers that transmit and receive data from up to 24 asynchronous and/or bisynchronous data sources.

MTS-1 costs $7,350 for four channels and $7,950 for eight channels from Timeplex at One Communications Plaza, Rochelle Park, N.J. 07662.

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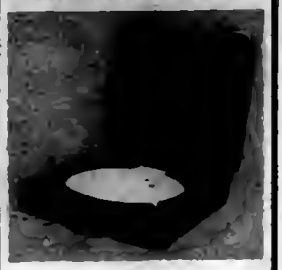

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Boasts 'Personality Features'

Terminal Falls Between Intelligent, Smart

ANAHEIM, Calif. — Lear Siegler, Inc. has unveiled a smart terminal that reportedly spans all features falling between conversational dumb terminals and programmable intelligent terminals.

Designated the ADM-31 Intermediate Terminal (IT), the product has microprocessor-based electronics and block mode transmission. Other features include two 1,920-character pages of memory, complete editing capabilities, function keys, visual attributes (reduced intensity, blinking, blanking, reverse video and underlining), numeric keypad, full- or half-duplex conversation modes and typewriter tab stops.

IT has "personality features" which can be modified dynamically at the keyboard to satisfy application needs that cannot be met by other features, according to a spokesman. An example of a personality feature is the terminal's ability to interpret the carriage return code so as to erase to the end of the line before performing the carriage return function, he said.

The cost of the ADM-31 is $1,450. Lear Siegler is at 714 North Brookhurst St., Anaheim, Calif. 92803.

Microwave Link Awaits Action

(Continued from Page 55)

changes in the rules governing multipoint distribution systems. Among other things, the FCC would allow these networks to support two-way transmission services. The outbound link would be the present 6 MHz channel used for TV broadcasts; the return would be a 120 KHz subchannel.

According to the FCC, multipoint distribution systems are now operating or ready to operate in 86 U.S. cities, and construction permits for some 50 additional systems have been awarded. Thus, if the commission implements its proposal, digital broadband local-loop distribution systems could become available quickly throughout the country — particularly since Microband Corp., recently acquired by Tymshare, operates many of these systems.

Tymshare, through its Tymnet subsidiary, is already a value-added communications carrier and will almost certainly use Microband's facilities to extend the reach of the Tymnet network.

According to SBS, however, the value of multipoint distribution systems to data communications users will be greatly diminished unless the FCC increases the bandwidth of the return channel.

A 120 KHz channel would allow users to "acknowledge receipt of information and communicate brief coded messages back to the sending node," but they "could not carry on a true interactive data exchange," the company said last month.

Increased Bandwidth

If 6 MHz return channels were authorized, however, a multipoint distribution system could provide "local data distribution to a number of customers within a limited service area." This greater bandwidth "would have sufficient capacity to support a broad range of user applications, including very high-speed digital data transfers, video teleconferencing, electronic mail and similar applications."

As an alternative to 6 MHz return channels, SBS suggested that the FCC allow operators of multipoint distribution systems to use paired 3 MHz channels for two-way data transmission. "Such an alternative would clearly not provide the same capacity for local data distribution as . . . paired 6 MHz channels," the company said, but this scheme "would be far superior to having only 120 KHz of bandwidth available for a return channel."

FCC staff members are now reviewing the SBS comments. By the end of this year, according to a spokesman, the commission is "likely" to reach a final decision.

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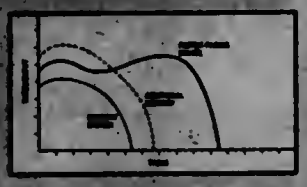

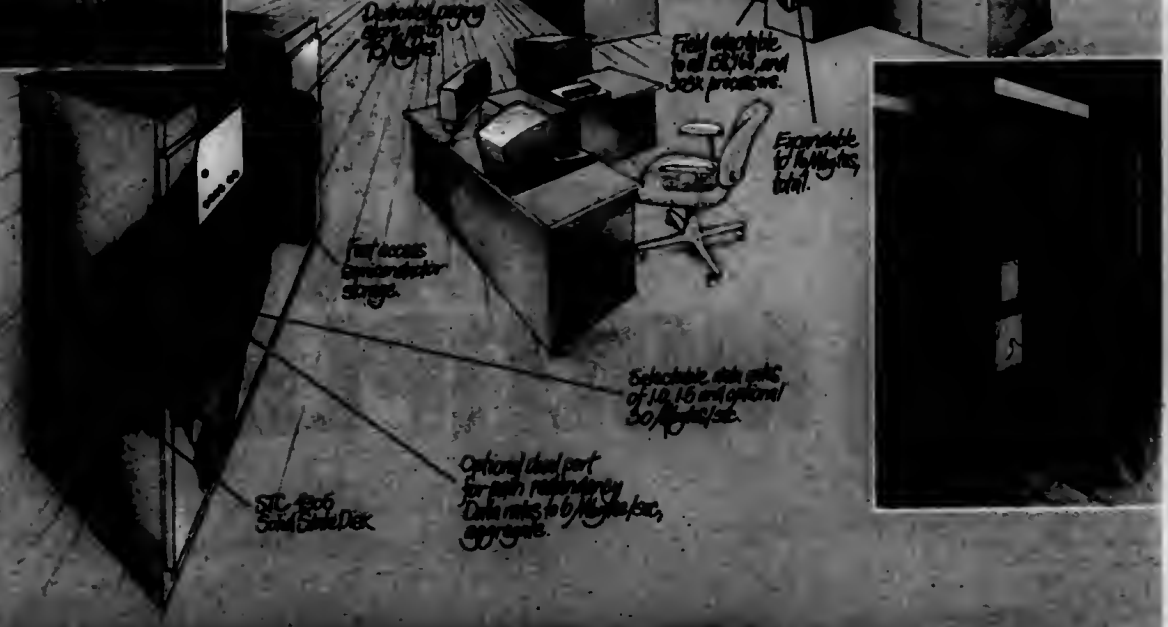

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IDS Offers Printer, Two Test Sets

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has introduced a modem eliminator, a printer, a test set and a miniaturized test set.

The Model 6100 modem eliminator was designed to permit the interconnection of terminal equipment without modems. It can be used in either asynchronous or synchronous modes and with terminals configured for half- or full-duplex operation, the vendor claimed. It costs $360.

The Model 2010 programmable digital printer is a thermal printer designed to operate with any IDS modem test set. Features include a presettable real-time clock, six selectable trigger channels and seven selectable print periods. The cost is $3,650.

The Model 1320 data test set was designed to analyze the error rate of any digital transmission network. It can be used to test synchronous, asynchronous or start/stop character-oriented systems such as time-division multiplexers, the vendor claimed. The Model 1320 costs $3,950.

The Model 65/60 miniaturized modem test set was designed to perform bit error rate tests on synchronous and asychronous EIA data communications channels. It contains separate transmitter and receiver sections, allowing full-duplex tests to be performed in either end-to-end loopback configurations, IDS said.

The price for the Model 65/60 is $850, the vendor said from 7 Wellington Road, Lincoln, R.I. 02865.

Testing Units Pocket-Sized

LITTLE SILVER, N.J. — Nu Data Corp. is now offering two electronic testing devices, the Model 920 and 921-T.

The hand-held microprocessor-controlled Model 920 provides data entry or retrieval and testing in duplex synchronous or asynchronous modes.

All Ascii, Ebcdic, Transacode and Baudot codes can be sent or received and displayed on a 16-char., 16-segment display in either alpha or hex format, except for Baudot, which has hex only.

The pocket-sized, battery or ac-powered-Model 921 interface test set was designed for field use. It installs between transmitting and receiving equipment to test and identify trouble sources.It uses mark and space signal simulation and provides for the visual display of 11 leads on 13 LEDS, the vendor claimed.

The Model 920 sells for $1,595 and the Model 921-T sells for $220, Nu Data said from 32 Fairview Ave., Little Silver, N.J. 07739.

PE Offers Link

OCEANPORT, N.J. — Perkin-Elmer Corp. (PE) has announced a data communications interface, the 801 Automatic Calling Unit Interface (ACUI), which allows PE's computers to interface with up to two Bell 801 automatic calling units.

Using the 801 ACUI, the computer system can dial any telephone number in the Bell Direct Distance Dial network to establish a data link, PE said.

The 801 ACUI sells for $1,600 from PE's Computer Systems Division at 2 Crescent Place, Oceanport, N.J. 07757.

Remote Printers Use Dual Micros

JESSUP, Md. — Digi-Data Corp. has introduced its 2510 series of remote printing stations that use dual microprocessor control to print up to 200 char./sec.

The printers are capable of sustaining a 1,200 bit/sec printing rate and will accept data bursts of 19.2K bit/sec with a buffered RS-232 interface.

The units use a Lear Siegler, Inc. nine-pin matrix print head and have a printhead failure rate of 600 million char. before failure, the vendor said.

The printers are priced from $2,150, the vendor said from 8580 Dorsey Run Road, Jessup, Md. 20794.

IT'S MORE THAN A MULTIPLEXER.

CRT Terminals' Keyboards Detach

TUCSON, Ariz. — A series of intelligent CRT terminals that feature detached keyboards and a variety of switch-selectable features have been unveiled by TEC, Inc.

The Series 670 Data-Screen terminals' detachable keyboards incorporate an optional 15-key numeric pad. The terminal's switch-selectable features, also standard, include 10- or 11-bit asynchronous Ascii data bytes with odd, even or mark parity; space code suppression during transmit; and automatic carriage return at the end of line, a spokesman said.

Other standard features include upper- and lowercase with descenders; conversational or buffered data communication capabilities, including line or page transmits at 16 different transmission rates up to 19.2K bit/sec; and software-controlled keyboard lock/unlock and local and teletypewriter keys.

Editing Package

The 670 terminals also have an editing package that consists of insert/delete characters or lines; a complete tabbing capability; and an erasing capability, the spokesman noted.

The terminal also offers a number of options. Included are a buffered or nonbuffered hard-copy adapter, light pen, auxiliary diagnostic test unit, up to two pages of additional memory and a 96-char. graphics set.

The price for the standard 670 terminal, with 12-in. screen and keyboard, is $1,590 with quantity discounts available from TEC at 2727 N. Fairview Ave., Tucson, Ariz. 85705.

Zentec Adds Generator To ZMS-40

SANTA CLARA, Calif. — Zentec Corp. recently announced an enhanced version of its ZMS-40 user-programmable intelligent terminal featuring an extended character generator and a telecommunications interface that functions in both synchronous and asynchronous modes.

The enhanced ZMS-40 incorporates an 8085A microprocessor, up to 32K bytes of random-access memory and 8K-byte read-only memory and customized firmware and software. Like the original model, the upgraded terminal has a 14-key numeric pad, 12 special-purpose function keys and 16 programmable function keys that operate both in a shifted and nonshifted mode.

A 128-char. generator is standard with the latest terminal, but an expanded generator which displays 256 symbols is also available. The programmable telecommunications interface employs a Zilog, Inc. communications chip that can operate at speeds up to 19.2K byte/sec.

Another option of the boosted ZMS-40 is a hidden attributes feature that reportedly provides off-screen storage of all video attributes and allows any attribute to be changed without using a position on the screen.

The terminal costs $1,720 with quantity discounts available from the firm at 2400 Walsh Ave., Santa Clara, Calif. 95050.

CDI Offers Converter

SOUTH HACKENSACK, N.J. — A code, speed and interface converter that can also act as a protocol converter linking two computers, has been introduced by Communication Devices, Inc. (CDI).

The Model 01-13-0090 reportedly accepts an input of current loop or EIA RS-232 and provides an output of EIA RS-232 and/or current loop, complete with battery and loop regulator.

Code translation and transmission rate are firmware-programmed, (erasable programmable read-only memory).

The unit contains 1K byte of random-access memory that is used as a circular buffer to store input or output data when the input transmission rate is higher than the output rate, or when the output conversion contains many more characters than the input data.

The unit costs $700 from CDI at 290 Huyler St., S. Hackensack, N.J. 07606.

Modtech Modem Out

LIVERMORE, Calif. — Modtech, Inc. has announced a limited-distance modem for asynchronous communications over private lines at distances up to 20 miles.

The M-SH1 transmits in full- or half-duplex mode up to 19.2K bit/sec over two- or four-wire continuous metallic circuits.

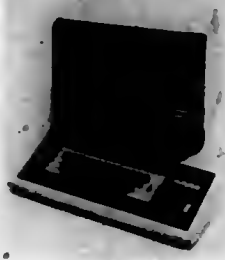
It connects to any device equipped with an RS-232C or CCITT V24 interface, the vendor said.

The unit costs $160 from Modtech at 1958 Helsinki Way, Livermore, Calif. 94550.

Volker-Craig Announces VT100-Compatible Terminal

WATERLOO, Ont. — Volker-Craig Ltd. has unveiled its VC2100 CRT terminal, designed for compatibility with the Digital Equipment Corp. VT100.

The VC2100 reportedly offers all the benefits of DEC VT100 compatibility as well as features the VT100 lacks, including microprocessor-based M6801, advanced video option as a standard feature, bi-directional/variable speed smooth scroll, eight programmable keys and local or remote copy, the vendor claimed.



The VC2100

The U.S. price for the VC2100 is $1,900, Volker-Craig said from 333 Metro Park, Rochester, N.Y. 14623.

Modem Gives 1,200 Bit/Sec

NEW BRIGHTON, Minn. — Multi-Tech Systems, Inc. has introduced the MT212D, an FCC-registered 1,200 bit/sec modem that is compatible with the Bell 212A.

The unit can accept full-duplex operation at 1,200 bit/sec over dial-up and two-wire lines. The unit will operate in an asynchronous or synchronous mode and is available in both a stand-alone or rack-mountable model.

The modem costs $695. Multi-Tech is at 82 Second Ave., New Brighton, Minn. 55112.

Unique Converts to RSX-11M

IRVINE, Calif. — Unique Automation Products, a telecommunications software supplier for Digital Equipment Corp. RT-11 users, is converting its product line to RSX-11M.

Currently, the Remote Job Entry program is ready for delivery. The next offerings will be EZTran, a Decnet alternative, and EZShar, for time-sharing links.

The firm still offers custom programming in the system integration and telecommunications areas for RT-11 and now RSX-11M users, a spokesman said.

Unique Automation Products is located at Suite L, 17922 Sky Park Circle, Irvine, Calif. 92714.

Unit Transmits Stock Orders

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THE PERSONNEL CRUNCH

By Harold S. Bott

Data processing executives face personnel problems in the 1980s that can only be characterized as dangerous.

The reasons are familiar. The backlog for DP applications requires three to five years and is growing rapidly. The increased demand for more applications comes at a time when DP budgets are skyrocketing, turnover is rapid, hiring is difficult and skills deficiencies are great. For many DP departments the personnel shortage has reached critical proportions.

Moreover, the workplace is changing, so motivating employees and properly supervising them will be difficult compared with the '70s.

In addition, some of the major trends in society itself will cause major problems for the DP workplace.

In order to increase productivity, increase job satisfaction and minimize personnel costs, DP management must adopt the new personnel and administrative tools that are emerging. They include executive management of systems, cross functional analysis, training needs analysis, new and better DP department organization, participative management, techniques for better understanding employees and career path planning.

The personnel scenario requires a closer look at these problems and some possible solutions.

Five major social trends will affect DP departments in the 1980s. They are:

- Continued economic difficulties and their consequences for American business.
- The increasing rate of technological change.
- The increasing levels of education and the importance of a college degree.
- Decreasing productivity.
- The changing nature of the work force.

There are other major trends — internationalism, regulation, defense, natural and human resource shortages — but they have much less direct impact on the DP environment.

The Economy

The American economy has not kept pace with the economies of other countries. The 1980 Economic Report of the President showed that the annual growth in gross national product per worker increased less in the U.S. than in other industrialized countries (see Figure 1).

Inflation will continue to rage in the 1980s. Government spending for defense and for social goals will continue to increase as will the size of our national debt. We will, in effect, continue to print money. Our balance of payments will be hurt because Opec and other nations will continue to raise the prices of raw materials. We will continue to experience trade deficits and a slowing rate of increase in our gross national product. Steel and automotive imports will increase; the value of the U.S. dollar will continue to decline.

To make things even worse, we are in the midst of a recession. Stagnation will continue, political leadership will be weak and economic pressure groups will remain strong. There will be uncertain economic conditions in the 1980s, to say the least.

Technological Change

Nevertheless, advances in technology will continue in many industries. In the DP industry, we will continue to see the switch from batch to real-time systems, more sophisticated minicomputers, data bases, data communications and voice communication. Distributed processing will become the norm but with stronger central administration of data. There will be new advanced programming languages which will approach English.

Hardware sophistication will increase in the '80s even faster than it did in the '70s. We may also start to see some standard systems for industries which begin to imply standardization of such items as part numbers. Computer-to-computer communication across corporate lines between vendors and suppliers will increase.

(Continued on In Depth/2)

The 1980s will see an exploding DP requirement. It will mean difficult obstacles for DP management to face, but the tools mentioned here will be of benefit in facing those problems.

Annual Growth in GNP Per Employed Worker
(major industrial countries, 1963-79)

Country	% Change Per Year 1963-73	1973-79*
United States	1.9	0.1
Japan	8.7	3.4
Germany	4.6	3.2
France	4.6	2.7
United Kingdom	3.0	0.3
Italy	5.4	1.6
Canada	2.4	0.4

*Estimate

Source: Organization for Economic Cooperation and Development

Figure 1

Output Per Hour of All Persons
(private business sector)

% Change Preceding Period	
1979	– .9
I	–3.0
II	–2.2
III	–1.3
IV	– .4

Source: Economic Report of the President, January 1980

Figure 2

DP Budget

Personnel	46.4%
Hardware	33.7
Other	19.9
TOTAL	100.0

Source: International Data Corp.

Figure 3

IN DEPTH

(Continued from In Depth/1)

A specific DP-oriented example of this increasing technological change is the office of the future with word processing as its centerpiece. Word processing was invented by the Germans to reduce redundant typing, but it has grown from simply replacing the typewriter to include office automation with smart copiers, machines capable of making images of documents that do not physically exist, electronic mail and computer graphics.

Rising educational levels and widespread popular knowledge about computers will affect the DP departments of all of American business. Not only will more people be receiving higher levels of education, but data processing will grow as an accepted major in more and more schools. Recently, the number of computer science majors has been increasing at a rate of 7% a year. There will be a significant increase in the number of computer science majors in connection with other subjects such as marketing or engineering.

Thus, our users in the '80s will no longer view the computer as a mysterious black box. Doctors, engineers and businessmen all will have had academic and work experience with our capabilities. Many will have experience with computers in their homes.

The increasing sophistication of the user has many ramifications for the management of DP in the '80s.

Productivity remains a problem in the U.S. Last year, according to the President's council of economic advisors, productivity in the private business sector decreased (see Figure 2 on In Depth/1).

Moreover, if one analyzes the data from 1965 to 1977, U.S. productivity increased only 1.9%. This is a rate slower than that in France or Germany and slower even than in Great Britain, where some say that the popular wisdom is that workers really don't work very hard.

There are many reasons for this decreasing productivity. The increase in the consumer movement is one. The slowdown in capital formation and thus in research and development expenditure is another. In 1964, research and development consumed only 3% of the gross national product. By 1977, however, it consumed only 2%. Moreover, there is a new attitude in our work force concerning mobility and especially toward work itself.

Changing Labor Force

A final major trend is the changing labor force. In the 1980s more women will be graduating from college and entering the labor force. Many older women, having reared their families, will reenter the work force. These women often will have college degrees, but in fields other than those in which they choose to reenter.

Among men, there will be a significant number of mid-life career changes. Loyalties which once were to the corporation will be more toward the profession. Thus, new workers will have new values and even loyalty to their employers.

These are the trends that we anticipate in the '80s and in many respects they are a continuation of the trends of the '70s. They will have a major impact on the way in which DP can function within organizations, and each has specific consequences for DP management.

Impact of Social Trends

Social trends will impact the DP department with increasing budget problems, training needs, user demands, changed employee personal goals, turnover and the possible growth of unions.

In the economic arena, the impact of economic problems on DP organizations will be significant. DP budgets have been growing at 14% a year from 1974 to 1980. With inflation, they will grow even more rapidly. Personnel costs and the costs of outside consulting have risen at 15% yearly. The cost of application software has increased 31%, and salary levels are rising rapidly. International Data Corp. (IDC) breaks down the DP budget into three categories (see Figure 3 on In Depth/1).

In the '80s hardware costs will continue to decline somewhat, but personnel costs will rise more rapidly. Thus, proper control over DP personnel is the number one problem that DP managers will face. It will be a greater problem than those related to hard-

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ware planning or software planning. The problem of controlling DP personnel will be even greater as many DP-oriented personnel will become members of user organizations and distributive environments rather than of a centralized DP department.

Skills Deficiency

The increasing rate of technological change will make keeping up with the state of the art very difficult. A DP organization must be technically current or it will be left behind. Its personnel must be familiar with the latest hardware and software.

With the knowledge of DP resident in many functional areas throughout a company, the demands on the DP department will be even greater. This poses a significant problem for many small- and medium-sized companies that made costly systems changes in the '70s, but did so without modern tools such as data bases. Conversions to integrated data bases will be very expensive. It will be very difficult for these companies to undertake another major upgrade in their data base because of the great pressures already on corporate profits in such companies.

This increased rate of technical change will mean an even bigger distance between the skills that are available and the skills that are needed. Obviously departments must not only maintain current skills, they must gain skills in the new technologies that are now upon us — distributed processing, security, distributed network design, data communications, voice communications, multiple hardware environments and microcomputers.

In addition, it will be necessary to understand new services that are available. Remote processing, for example, is increasing at 17% per year. Interactive remote processing using data base is increasing at 25% a year. The use of remote external data bases such as freight rate data bases is increasing. Many new types of application software are now on the market and departmental management should be aware of them.

The impact of these new technical requirements will be significant. Managers must have new processes to control the skills available and the skills required. Management skills to control the new, more complex environment will be critical. Managers must enhance their skills in planning and project control, to mention just two important areas.

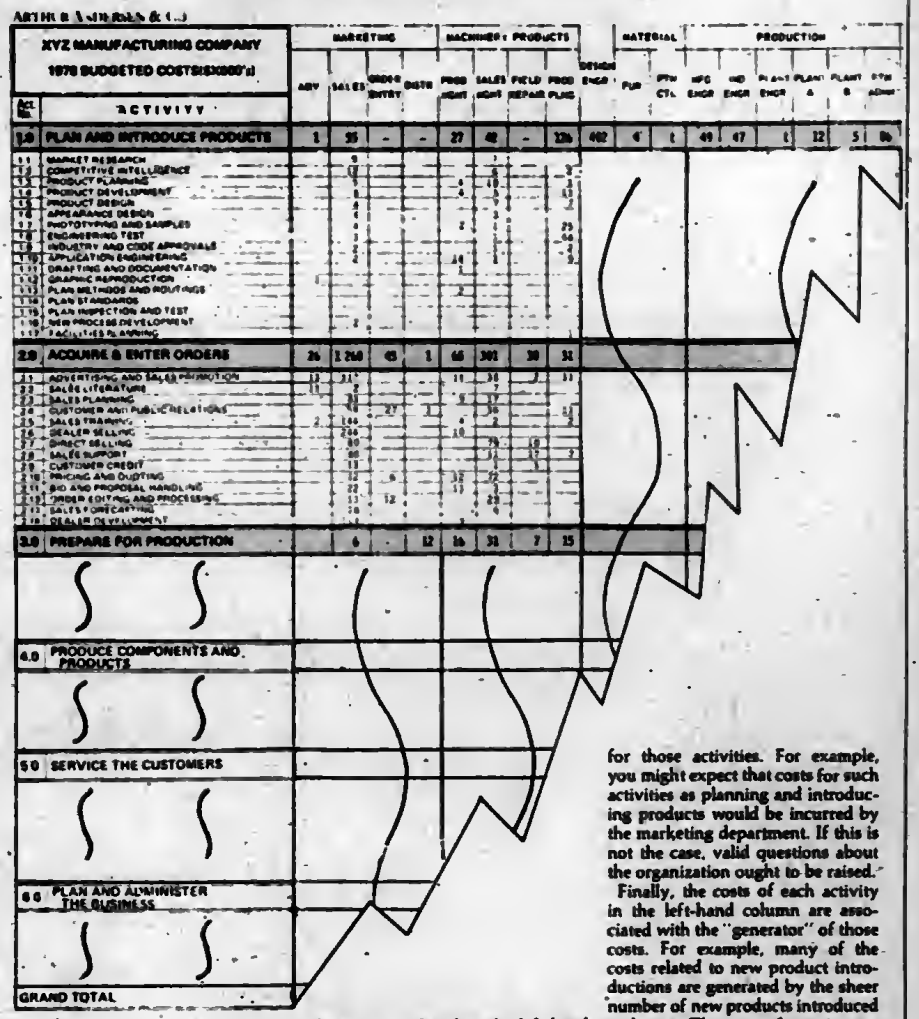
Increased Educational Demand

The effect of rising educational levels on the DP department will be significant. First, there will be a very large increase in the demand for new systems. This will cause DP departments to look more and more to the outside for help in creating new applications.

It is anticipated that there could be as much as a 32% increase per year in application program package utilization (see Figure 4). But many packages contain poor coding since they were

(Continued on In Depth/6)

Cross Functional Analysis



Cross functional analysis helps to establish priorities among systems projects.

The technique begins by defining the basic activities of a business, such as entering an order, starting the order in manufacturing and shipping the order.

Typically there are at least 200 such activities in most medium-size businesses, but they are not reflected in the typical chart of accounts. It is possible, however, to associate costs with these activities, even when the costs cross functional lines (as when the company president spends time on a sales call or when a salesman spends part of his time expediting an order).

In the accompanying chart, the various activities required to run the business are listed in the left-hand column. These are the activities that must be accomplished whether or not they are reflected as separate items in the chart of accounts and regardless of which department performs them.

The company departments or organizational units are shown across the top of the chart. Below each department are listed the dollar expenses allocated to each activity in the left-hand column. Total figures by activity are shown in gray.

When all the figures are filled in, the chart can be analyzed. First, a review of the total dollar amounts for each activity is made to see if the total is reasonable in terms of expectations.

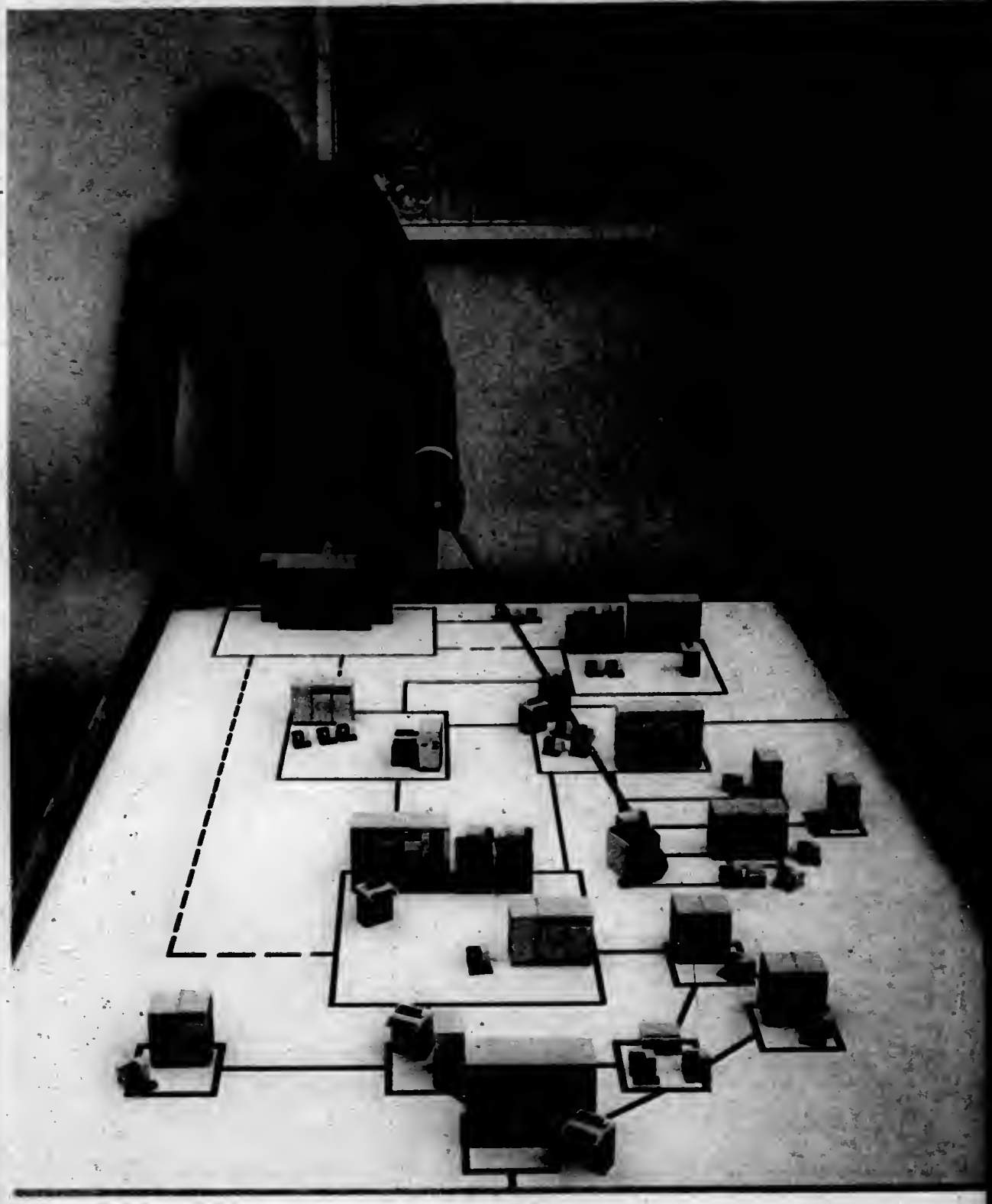
Next, a review is made of the departments that incurred the costs for those activities. For example, you might expect that costs for such activities as planning and introducing products would be incurred by the marketing department. If this is not the case, valid questions about the organization ought to be raised.

Finally, the costs of each activity in the left-hand column are associated with the "generator" of those costs. For example, many of the costs related to new product introductions are generated by the sheer number of new products introduced each year. The costs of entering orders are generated by the number of orders entered and so on.

In these cases, the analyst divides the total activity costs (gray bars) by the number of cost generators to determine the cost per occurrence. Thus, if the cost of order processing is $100,000 and 2,000 orders were processed, the cost of processing a single order is $50. Other activities, such as the cost of reviewing a customer's credit, might also be related to incoming orders.

If the cost of all the activities generated by incoming orders is excessive, a manager might consider how to reduce that cost through better systems or by lowering the number of orders processed through a minimum order size policy.

DEC Datasystems. How to gain the benefits of distributed computing without losing control.



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IN DEPTH

(Continued from In Depth/3)
created before the era of data bases and many have inflexible code. Contract programmers will be utilized at a rate of 10% each year, primarily to help install packages.

It is anticipated that the DP consulting firm practice may increase at about 10% a year and overall the DP budget will continue to rise significantly more than the 15% a year of the late 1970s.

Employees will more frequently find a conflict between company goals and their own personal goals. Although they are initially attracted to DP as an exciting and dynamic field, they will not necessarily remain in the field if their career expectations are not met. Educated personnel with a DP background can be useful in many other fields as well, and they will change fields.

Recent trends among DP personnel are alarming. Recruiting is falling 25% below demand. The sources of recruiting are drying up. There are fewer responses to ads; jobs remain open for longer periods of time. Any trends in the short term to the contrary merely reflect the temporary effect of the recession.

Personnel shortages put more pressure on DP management, which must properly match the skills with the needs. If people are overqualified for the task they are given, there will be turnover. If they are underqualified, there will be lower productivity. Even worse, there will be project failures.

Turnover is a growing problem. A recent issue of *Datamation* showed that turnover was running at about 28% a year on the average, and for programmers, turnover was as high as 34% a year.

This means that most people in a DP department have changed within about three years. Fortunately, there are some oldtimers who remain. But one difficulty is that these people must now be used to train the newcomers rather than work on products. Because of turnover, it is often necessary to overstaff systems projects.

IDC, in a recent study, addressed the problem of turnover. The largest cause of turnover is that programmers can find better jobs. The second largest reason for turnover is related to the change in the work force — family-oriented reasons. Spouses move to new jobs, the jobs interfere with private lives, some people no longer have to work and some dislike having to change locations.

In 1979 DP departments experienced a 10% shortfall in personnel overall and had 17% of their programming jobs going begging. The figure was as high as 17% for communications experts. In 1980 it is expected that DP departments could have as much as 25% of their posts open and in certain geographic areas as much as 30% of their posts open. Increased turnover means productivity loss because of learning curves even when these positions are filled.

Overseas the problem is little better than in the U.S. In Britain, for example, a survey by Urwick Computing found similar shortages. In France the shortage of trained DP people is a matter of state significance and the premiere of France has commissioned studies to determine what can be done to alleviate the situation.

There is a particular problem with respect to programmers. Every programmer wants to become an analyst as soon as possible. Over a five-year cycle, 67% of the total effort in developing a system is maintenance programming. But maintenance programming tends to reduce programmer career motivation.

Maintenance requirements are rising rapidly. According to Input, 1979, about 49% of the programming effort in an average DP department is now new systems work, 45% is maintenance and 6% is administration (see Figure 5). This trend is shifting toward more maintenance on new systems and more modifications to applications programming packages.

At the same time there is huge pressure on DP departments to install new applications. An average department will have a three- to five-year backlog of systems projects, according to one survey. Thus, lower career appeal, turnover and increased backlog pressure tend to cause productivity to decline. Productivity is declining also because processing personnel are seeking ends other than those related to output.

More educated users make higher de-

What's the difference between BASIC and Pascal?

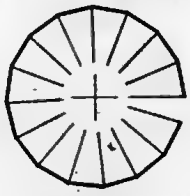
COMPARE THESE APPROACHES TO DRAWING A CIRCLE

in BASIC

"This is easy..."

```
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```

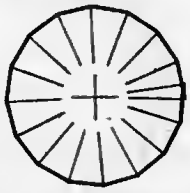
"Oops, didn't quite meet ...



... but that's easy to fix."

```
100 MOVE R,0
110 FOR T=0 TO 360   +25
                     STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```

"Oh, now it closes ...
in fact, it overlaps."

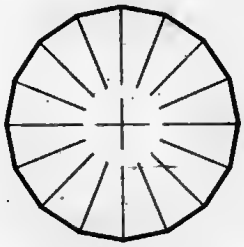


Programming by trial and error

in Pascal

"The simplest circle drawn with line segments is a regular polygon ..."

```
procedure Circle (X, Y, Radius: real);
const Sides = 16; Pi = 3.14159265;
var   N : integer; Theta : real;
begin
  Move (X+Radius,Y);
  for N : = 1 to Sides do begin
    Theta : = 2 * Pi * (N/Sides);
    Draw (Radius * cos (Theta) + X,
          Radius * sin (Theta) + Y);
  end;
end;
```



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mands for new systems. More educated DP employees seek not only more satisfaction in the work itself, but also achievement, recognition, responsibility and advancement. DP personnel now want to participate in job-related decisions that affect them. They are no longer satisfied with authoritarian or paternalistic styles of management. DP personnel are becoming reluctant to accept second- or third-shift assignments or weekend work.

The growth of unions is possible with the changing nature of the labor force in the '80s. Today, unions are not widespread in DP. Unions can affect the flexibility to move analysts and programmers around as the need arises. They can result in even higher pay and benefit demands. Unions can insist that promotion be on the basis of seniority rather than merit. Thus, it is possible that unionism could increase the cost of DP and make efficient management more difficult.

In summary, these social trends will make management of DP personnel in the '80s much more difficult. We can look forward to increased personnel costs, significant technical innovations, a growing disparity between skill needs and skill availability and between company and individual goals. We can foresee an increasing backlog of projects, increasing employee turnover and, perhaps, more unionism. There is an absolute need for better personnel management tools to help solve these problems.

Possible Solutions

What are some of the personnel and administrative tools that may be useful to DP managers in the '80s?

The first is a job classification and pay system. If salary ranges are too high, excess cost will be incurred; if they are too low, there will be costly turnover. A job classification and pay analysis can ensure that salaries paid are commensurate with the skills and responsibilities of the various individuals in the department.

Job classification levels are determined by assigning points to such factors as the importance of the relationships required, the amount of education required and the experience required. Then current positions are inventoried in terms of job points, placed in classification groupings based on point totals and present rates of wages and salaries are associated with the classifications. A pay plan is developed based on a salary survey for jobs of like responsibility in the community as well as on the basis of company financial constraints.

A program for periodic review of jobs and performance in the jobs is developed, and then the entire class and pay scheme is implemented. Class and pay systems help ensure that wages are commensurate with responsibilities and with the market.

Executive Role

Due to the increasing costs of DP in a difficult economy, it is important that executive management be involved in DP decisions and that it support them. An approach described as the "executive management of systems" focuses on the communications between executive management and DP management (see Figure 6).

Executive management must be involved in organization planning. It must understand proper control of resources and must know proper purchasing, vendor and perhaps chargeback and rebilling procedures.

Worldwide Revenues Of U.S. Independent Software Suppliers
($ Million)

	1979	Compound % Δ	1984
Custom	745	10	1,200
Packaged	126	19	296
Systems	335	29	1,192
Applications	459	32	1,852
Subtotal	920	30	3,340
TOTAL	$1,665	22	4,540

Source: International Data Corp. 1980 Briefing Bulletin

Figure 4

Programmer Utilization

Industry Sector	Percent of Use Programming Personnel: New Program Development	Existing Program Maintenance
Discrete Manufacturing	56%	41%
Process Manufacturing	51	43
Transportation	48	48
Utilities	48	53
Wholesale Distribution	51	41
Retail Trade	64	29
Banking & Finance	39	51
Insurance	42	51
Services & Other	48	48
Average	49%	45%

Source: Input EDP User Panel 1979

Figure 5

Executive management of systems involves summary reporting to help management determine how well DP is doing. It includes procedures to convey management plans and objectives to the DP department in a structured fashion. It involves the development of budgets and the development of measures to evaluate systems projects in terms of timeliness and cost. In addition to monitoring costs, the procedure provides reporting mechanisms so that executive management can be informed of the quality of systems that are being installed and the security of these systems.

Executive management of systems is becoming increasingly important as companies become more dependent on DP systems. There have been recent cases where companies have failed, and the causes of failure have been attributed to DP negligence, such as the failure to back up files properly. To avoid such situations, top management must be involved in critical DP activities.

There are other means of helping to control DP costs in the economically troubled 1980s. One particularly useful tool is cross functional analysis (see box on In Depth/3), which is used to evaluate the priorities of a possible new system or to rank the proposed system with other system proposals.

Project Management Techniques

Management ought to define the major steps for each systems project. At the outset, project management can only define in detail those steps required in the design phase. After the design phase, project management is

(Continued on In Depth/8)

Executive Management of Systems

Strategy
- Information Processing Services (IPS)
  - Goals and Objectives
- Coordination With Organization's Objectives
- Review and Approval by MAC
- Communication With User Management
- IPS Functional Strategy Coordination
- IPS Functional Strategy
  - Personnel
  - Space and Location
  - Administration
  - Quality Assurance

Planning
- IPS Organizational Plan
- Annual IPS Budget
- Systems Plan Initiation
- Personnel Plan
- Individual Manager's Objectives
- Administration Plan
- Quality Assurance Plan

Control
- Reporting of Key Control Factors
  - Systems Project Status Reports/Exceptions
  - Maintenance Activity and Backlog Reports
  - Capacity Utilization and Trends Reports
  - Service Level Reports
- Financial Reporting
- Budget/Variance Performance Analysis
- Personnel Career Path Tracking
- Quality Assurance Reviews
- Functional IPS Reviews

Transactions
- Performance Results
  - Performance Monitoring System
- Budget Analysis
- Personnel Activity Reporting
- Internal Administrative Systems
- Audit Triggers
- Quality Assurance Exceptions/Follow-Up

Figure 6

IN DEPTH

(Continued from In Depth/7)

able to detail the steps required for installation, and after installation management is able to detail the steps required for ongoing maintenance. At each of these checkpoints the major steps in the following phase are defined and those steps which are large or have considerable risk are planned in great detail. Planning is done for cost and time. Frequent reporting against both time and dollar plans enables management to monitor the status of the project from the outset and avoid surprises if the project is not progressing well early on.

Department Training

In order to react to the increasing technical requirements, additional training is required in the DP department. Much of this training must be technical and must concern data base technology, teleprocessing, data security, restart and recovery, CRT design, distributed DP, office automation and new programming languages. It is necessary to retrain not only systems people but also users because of the significant amount of turnover in most organizations. Training in the '80s must cover not only the technical subjects developed in the '70s but also the new technologies developing in the '80s.

Equally important, DP management must be trained in new managerial techniques. These techniques include systems planning, internal control, operational auditing, business fundamentals, accounting, project management, effective presentations, report preparation and leadership. In the 1980s managers must be good businessmen to supervise their departments properly.

Training Needs Analysis

More and more DP departments are looking to the outside to meet their training requirements. At present about 38% of DP training is handled outside the corporate DP department. The reason DP managers are looking to the outside is that outside suppliers frequently have better facilities and can conduct more cost-effective training than the department can.

Often an outside trainer will undertake a formal review to determine the training needs. Such a review is called a "training needs analysis." The reviewer gathers a great deal of preliminary information such as business results, performance and organizational information. He also surveys the perceived needs through discussions with DP management. Once the interviews and the data have been analyzed, a program is developed, not only of technical subjects, but also of functional and managerial training. When the needs have been established, plans are then made to develop training material: how many training designers are required and how many subject matter experts are needed.

Departmental Organization

The increase in applications demand plus new hardware and software technology are pointing up new organizational needs in the DP department. Planning groups that can coordinate the needs for hardware and software are required. DP controllers are needed to work with users on the operating side.

The rising level of education of DP people has created a need to change the way work assignments are made. So much maintenance is required that departments need better procedures for assigning maintenance and still preserving stimulating career opportunities.

One major corporation hires contract programmers to do as much of the maintenance work as possible, leaving its own programmers free for new systems development. Another major corporation rotates new programming and maintenance work on the assumption that after the push of a major new systems installation, personnel are ready for a series of small, less pressured maintenance assignments.

Technology also affects the organization of DP departments. Not long ago the trend was to centralize DP skills and activities because of large central CPUs. Then the trend reversed and decentralization became popular with distributed processing. Currently, the thinking is that a proper mix of decentralization and centralization depends on a number of factors including the corporate organization philosophy, the hardware and whether it is distributed or centralized, and the commonality of user needs and systems.

Interfunctional Coordination

Education has meant more educated user personnel. Distributed processing and the popularity of report generators has meant far greater user involvement in systems development. The days of interaction exclusively between the DP department and the accounting department are over; today many users must interface with DP.

Thus, when projects are undertaken it is necessary to establish proper means of participation for different user groups who will benefit from the project. Executive steering committees of senior executives should often be established to lead new projects. At the working level project advisory teams, which include middle-level members of the user departments and technical DP personnel, are needed. If users are not involved — and if new systems are therefore not accepted — there can be great frustration among DP personnel.

New Productivity Tools

Programming workstations are being installed to help improve programmer productivity. The programmer enters code at a terminal, and in certain situations he can select among parameters and options. Programming workstations allow a programmer to program on-line and eliminate the need for coding sheets, pencils, card decks, docu-

'The rising level of education of DP people has created a need to change the way work assignments are made. So much maintenance is required that departments need better procedures for assigning maintenance and still preserving stimulating career opportunities.'

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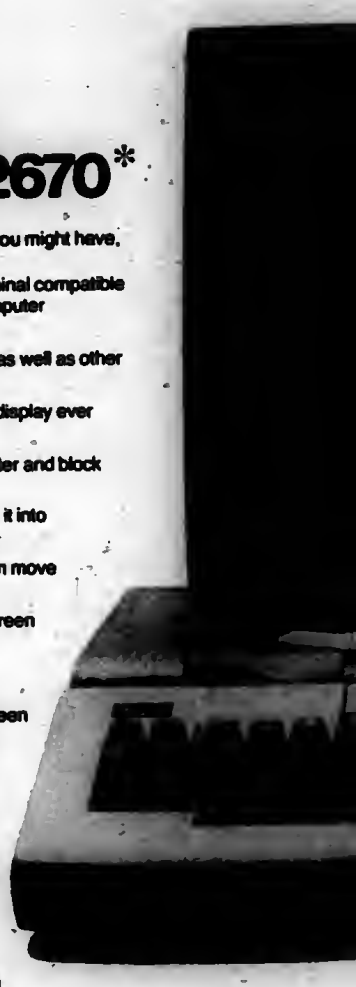

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mentation typists and walks to the computer room. Programming stations can speed development and reduce maintenance. They can reduce testing and provide better documentation, better visibility for project management and systems with better security.

There are a whole range of new programming and debugging software aids, such as documenting and flowcharting software, report writers, dictionaries and table maintenance systems. Logic libraries are being conceived whereby coded subroutines can be reused. Employees know these tools exist, and DP management must consider making them available.

Structured systems planning can help make departmental personnel more effective. Such productivity controls as structured project management, formal testing, formal work programs and project status reviews can also help to improve project productivity. In addition, programming standards can be related to actual performance on performance reporting.

(Continued on In/Depth 10)

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___ Model 13	RS-232 & RS-422 point to point	$1320
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___ Model 22	RS-232 point to point/20MA current loop	$1520
___ Model 23	RS-232 & RS-422 point to point	$1520
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IN DEPTH

(Continued from In Depth/9)

New methods of improving productivity relate to the new structured programming and structured design methodologies. These methodologies can reduce programmer time, provide better documentation and lower maintenance requirements. Method/1 is an example of a structured methodology which we think will help increase productivity (see Figure 7). It is a comprehensive integrated approach for planning, designing and installing supportive systems.

Documentation is provided of structured methodologies for explaining detailed tasks, for forms required for each task, for systems documentation aids and for systems management. There are detailed task description and documentation for preliminary systems designs, for systems installation and for production systems support. There are checklists for quality control, outlines of job manager responsibilities and estimating guidelines.

Personal Goals

More educated employees also react better to participative leadership styles. The old leadership styes have to be eliminated. Managers will have to solicit and incorporate employee suggestions in decisions that affect these employees personally. There has been a great deal of experimentation with such styles in Europe and Japan, and American managers have a lesson to learn from their counterparts in these countries.

Management by objectives (MBO) is not a new subject, but it can be helpful in administering the more educated employees of the '80s. In an MBO program, one defines objectives with the employee to suit both company needs and individual needs. Specific steps to achieve the objective are outlined; dates and defined output are documented. Such objectives include work assignments as well as training. Objectives are documented and reviewed periodically. Such a program helps to make the department responsive to both company and individual needs.

Managers can attempt to improve productivity through a genuine effort to improve motivation and to understand their subordinates better. They should start by analyzing employee strengths and weaknesses, their sources of motivation and their career goals. Managers should establish an effective transfer policy so that people are placed in roles where they can be most effective. Managers should maintain records on their key people, plan ways in which they can spend time with them and think through how they can recognize the achievements of their people. Personal attention will go a long way toward improving motiva-

(Continued on In Depth/14)

Method I
(Various Manuals)

Systems Management
- **Systems Planning**
- **Preliminary Systems Design**
  - —Task Descriptions
  - —Documentation
- **Systems Installation**
  - —Task Descriptions
  - —Documentation
- **Production Systems Support**

Project Management
Maintenance Management
Work Programs
Estimating Guidelines
Project Control Procedures
Quality Assurance
Documentation

Method I is a newly released Arthur Anderson & Co. structured methodology which uses techniques and addresses problems that did not exist a few years ago when systems were far simpler. The structured documentation emphasizes clear and concise communication which can build the important bridge from user requirements to the analyst's design to the programmer's implementation.

Figure 7

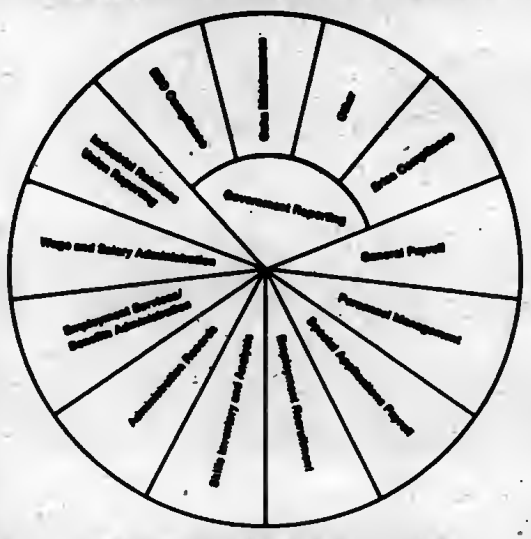

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Figure 8

IT'S EVEN EASY TO READ THE FINE PRINT

Outline of Terms of Purchase.
IBM 3101 and IBM 3102 Machines.

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Payment is due 15 days after the Date of Installation. The Date of Installation of the machines is deemed to be two days after the date of receipt by the Customer. In addition to the purchase price of the machine, the Customer agrees to pay all applicable taxes and shipping charges.

INSTALLATION

The Customer is responsible for unpacking, checking out and setting up these machines.

TITLE AND RISK OF LOSS OR DAMAGE

The title to each machine passes to the Customer on the Date of Installation. Up to and including the Date of Installation, the risk of loss or damage will be borne by IBM. Thereafter, risk of loss or damage will be borne by the Customer.

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IBM warrants that each machine will be in good working order on the Date of Installation and that it will conform to IBM's official published specifications.

For three months commencing on the Date of Installation of each machine, IBM agrees to provide at no additional charge to the Customer, warranty service at an IBM Repair Center to restore the machine to good working order.

DETAILS OF THIS WARRANTY, AND EXCLUSIONS FROM WARRANTY SERVICE, WILL BE PROVIDED AT THE TIME OF ORDER CONFIRMATION.

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IBM will provide the estimated shipment schedule for this order in writing at the time of order confirmation. IBM reserves the right to amend the estimated shipment schedule as necessary.

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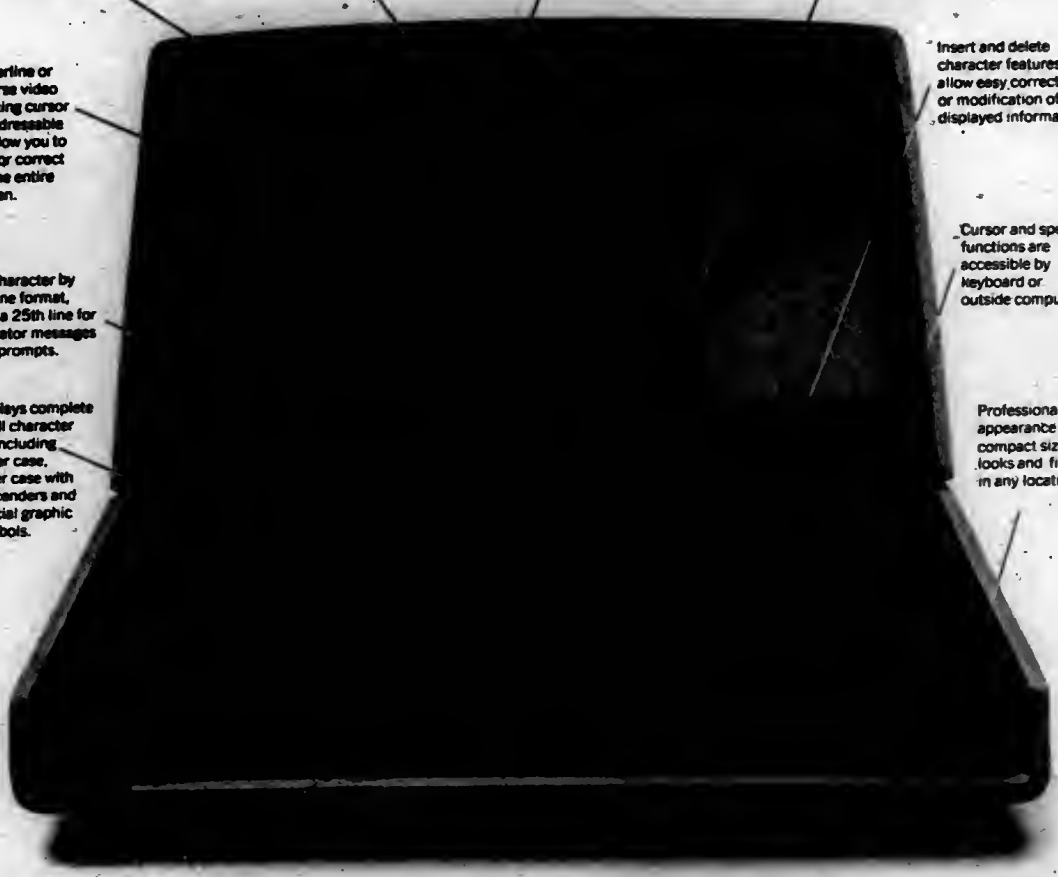

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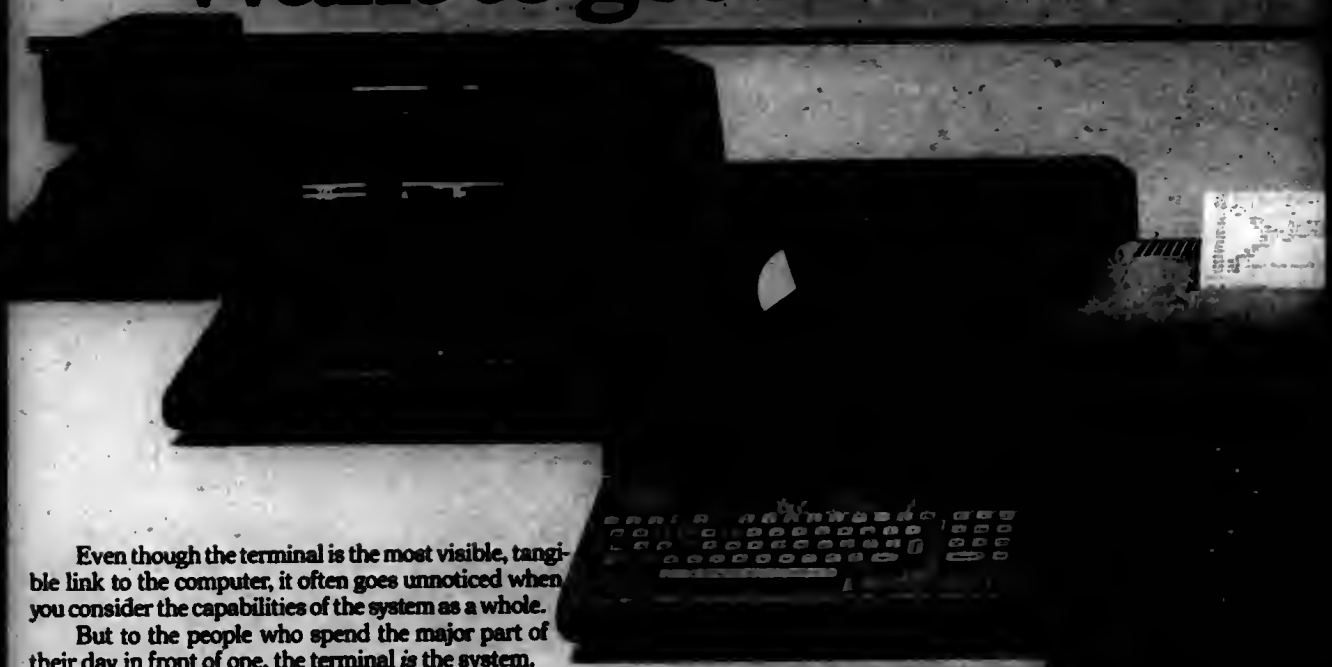

Even though the terminal is the most visible, tangible link to the computer, it often goes unnoticed when you consider the capabilities of the system as a whole.

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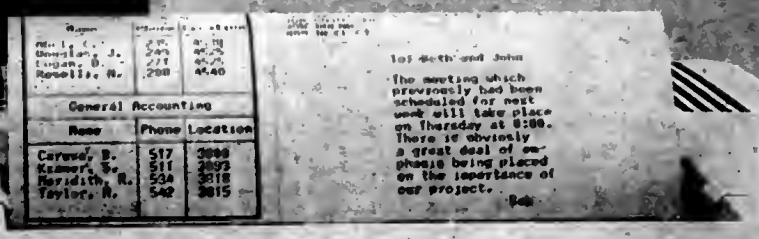

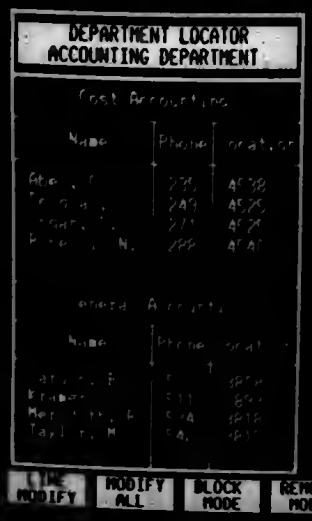

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CW 9/15

IN DEPTH

(Continued from In Depth/10)

tion.

In addition, managers must be prepared to react to and use the new personnel practices which will become prevalent in the 1980s: flexible time, sabbaticals, benefits menus and the four-day week.

More formal employee information systems can be helpful in controlling the changing labor force. Figure 8 is an illustration of the modules in a representative employee information system.

Managers are recognizing that employee information that can be obtained rapidly can be extremely useful in making timely staffing decisions. Such systems can result in improved employee morale, since they convey to employees the credibility of the corporation's personal interest in them.

In addition to payroll and labor distribution, such systems may contain modules for benefits administration; wage and salary administration; salary change analysis; Equal Employment Opportunity Commission (EEOC) modules providing numbers of men and women and minorities by job classification; an Occupational Safety and Health Administration (Osha) module providing information on attendance at safety training programs, education and training modules providing courses attended, courses scheduled; career path and skills inventory modules providing skill codes, job potential and job preferences indicated; manpower planning modules providing open posts; and labor relations modules providing union lists and overtime.

Employee information can be automated and should not be maintained in small manual files throughout the company.

Career Path Planning

Another way to address the challenge of a changing labor force is through career path planning. Career path planning can increase productivity, reduce turnover and thereby benefit the organization as a whole. The best qualified people are identified. Training efforts are targeted and assigned to meet organizational needs as well as corporate needs.

Career path planning permits cost-effective training programs which can also benefit the individual. If his career path is known, an employee can develop his interests more effectively. He is less likely to be slotted into positions that do not fit his talent.

Research has shown that career path planning increases employees' satisfaction because they can better see what the future may hold for them.

The first step in career path planning is to organize the program. Each position is defined in terms of its tasks and requisite skills. Various paths of progress are defined. Programmers, for example, might progress from maintenance programming to package programming to custom programming to systems analysis, or they might progress to technical specialists. The skills required for each position are analyzed and the overall level of skill is determined. A network of possible horizontal or vertical career moves is established.

Next, personnel within the department are evaluated. Training needs are identified in terms of catch-up or enhancement, and required training costs are projected. The career path program is then communicated to individuals and made part of an ongoing management system. The products of a career path program are the development of horizontal and vertical paths, job descriptions profiling skill requirements, planned training needs and skill ratings.

In summary, management must adjust to the challenges of the '80s. It must consider new techniques to combat a difficult economy, class and pay systems, new budgeting techniques such as cross functional analysis and the executive management of systems. To address the rapidly changing technical environment, management and technical training is needed. Training needs analysis may be helpful. To address the increased educational levels, new programs for participative management and management by objectives should be considered.

Productivity decline may be arrested through new standards and project controls and through structured analysis such as Method/1. The changing labor force can be monitored more closely through employee information systems and career path planning.

The 1980s will see an exploding DP requirement. DP management will face many difficult obstacles, but the tools mentioned here will be of benefit in facing these problems.

The decades of the '80s will combine danger and opportunity for the DP manager in the motivation and supervision of personnel. It will be a challenging period indeed.

Harold S. Bott is a partner in the management information consulting division of Arthur Andersen & Co., Chicago.

Bott is the managing director for planning and operating information and is responsible for human resources, business planning, profit improvement, materials management, office automation and related service areas.

Bott holds a B.A. degree from Princeton University and an M.B.A. from the Harvard Graduate School of Business Administration.

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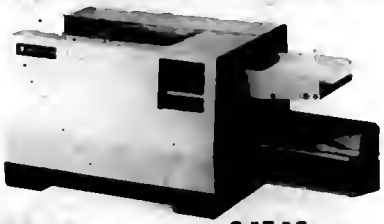

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"Put It In the Contract!"

By David J. Connolly

The selection of a software program that best fits a user's needs can be — and usually is — a formidable task. The process involves the coordination of a variety of disciplines, each of which may have significant effects on the user's business.

In addition to the technical considerations, the user must also be concerned with the legal consequences of the transaction and associated administrative details.

The selection process is further complicated by the fact that most programs will contain a number of latent errors which may not be discovered until the program is executing in the user's operational environment. As a result, the user's business may suffer significant losses and damages.

Besides problems with the software itself, the user must cope with a variety of issues that are inherent to the software industry. Unlike their hardware counterparts, software companies can be formed with a minimum amount of capital investment. Basically, the initial investment need only cover office expenses, advertising and the cost of developing the programs. The software industry therefore has a much more volatile nature than the hardware industry.

Indeed, the software industry has developed a "revolving door environment" in which companies are continually established and, shortly thereafter, terminated for any one of a number of reasons. Only a relatively small number of software companies will mature into financially stable businesses.

The instability of the software industry presents a major area of concern for the user. The user must be assured of the continued existence of the vendor in the foreseeable future so its software will be serviced. At a minimum, the user will require the vendor to correct any bugs in the software and to develop future enhancements which the user may require.

As a corollary consideration, the user should realize the possibility always exists that its business will incur losses and suffer damages from defective software. If that occurs, the existence of the vendor becomes essential in order to reimburse the user for the losses it has suffered or to join as a party defendant in subsequent litigation.

Anticipating Problems

The problems described above are only a sample of the critical issues a user faces when purchasing a major software program. However, if the user adheres to a comprehensive acquisition strategy, it should be able to anticipate and resolve many potential problems before they occur.

In addition, the user will be able to ensure that it is provided maximum legal protection in the event a dispute with the vendor does arise. Unfortunately, many users segregate the software technical evaluation and selection processes from any associated legal consideration.

In the typical transaction, the user will not consult with his attorney and will not consider any associated legal ramifications until just prior to the execution of the sales contract. History can verify that this approach can only lead to problems and potential disaster for the user. Ideally, the legal considerations should be integrated into each phase of the acquisition process.

Prior to any contact with software vendors, the user must define his processing requirements in a clear and unambiguous manner. Typically, the user's requirements will be contained in a document called the software specifications.

While the generation of this document is a time-consuming and expensive project, it will produce a number of beneficial results for the user. Primarily, it will allow the user to establish a set of standards against which potential programs can be measured.

Natually, the more detailed the specifications, the stricter the performance standards for the program will be. The specifications will also communicate the user's processing requirements to the software vendor.

The source of a great many problems is poor communication between the user and the vendor. The vendor often does not completely understand the user's requirements, while the user expects more performance from the software than it has indicated to the vendor. Many of these problems can be eliminated through detailed software specifications.

The software specifications will also have significant legal implications. Generally, no agreement made between the parties will be enforceable in a court of law unless it is specifically included in the final, written sales contract.

Although this point may appear obvious, it is often ignored or overlooked in computer transactions. Either the user will neglect to produce the software specifications or it will fail to incorporate them into the final sales contract.

Without a standard against which to measure the performance of a program, any program delivered by the vendor that conforms to the general description of the user's processing requirement, contained in the sales contract, will satisfy the vendor's obligations. In order to avoid future problems, the user should incorporate any agreements, including the software specifications, made with the vendor into the written sales contract.

Vendor Negotiations

Upon completion of the software specifications, the user should begin evaluating and selecting a program which can satisfy his processing requirements. Inevitably, as part of this process, the user will engage in some type of negotiation with the vendor.

Negotiations can be informal, involving only the user and the vendor's sales personnel, or formal, involving both parties' legal and technical representatives. Regardless of the formality of the negotiations, it is imperative that the user take minimum precautions during this critical phase of the acquisition process.

The preliminary contact with the vendor will involve his sales personnel. During this process, the user should take care to accurately record all representations which are made. Besides detailing the processing requirements, the parties should also agree to definitions. Any potential ambiguity or misinterpretation should be resolved to the mutual satisfaction of the parties.

At the culmination of the negotiations, all agreements, representations

(Continued on In Depth/16)

IN DEPTH

(Continued from In Depth/15)
and warranties made between the parties will be incorporated into the final sales contract.

Sign With Caution

The user should be extremely wary of signing the vendor's standard contract without first reviewing it for both its legal and technical contents. All vendors have similar sales contracts which secure for them maximum protection while providing the user with the minimum legal protection required by law.

It is essential that the user appropriately modify the sales contract to reflect the realities of the purchase. The contract should be modified to provide the user with equitable protection in the event future problems do arise. Unfortunately, the modification of the standard sales contract is not a simple process and requires a combination of expertise in both the computer and legal areas.

While modification of the standard sales contract may be in the best interest of the user, insufficient modification may be more detrimental than beneficial to him. Any changes made are indicative that the user has examined the standard contract and is satisfied with it as modified.

However, the vendor will often agree to only cosmetic contract changes which do not alter any right or liabilities of the respective parties. The vendor is very aware of the substantive contract clauses which provide him the maximum legal protection. The user can be assured that these clauses will be retained unmodified in any sales contract to which the vendor agrees.

Difficulty for User

Typically, the user will encounter difficulty in determining the modifications required because of the inherent nature of the contract. Basically, the sales contract is an integration of technical consideration expressed in a legal document. In order to understand the legal ramifications of the contract, a person need also understand the software industry and its technology.

The final document will contain a mixture of legal and technical terms. If a contract is to be properly modified, the user must be able to anticipate potential technical problems and provide adequate remedies in legal terms for incorporation into the contract. However, the user cannot segregate either the technical and legal issues from each other. This interdependence of distinct and separate disciplines makes modification of the standard vendor contract a nontrivial exercise.

The need for the user to contractually protect himself is emphasized by the potential damages he may suffer with a defective computer. Clearly, the cost of the computer is not the extent of the damages which the user may suffer; the user must also consider loss of customers and the taint of his business reputation, the cost of purchasing a new system, the cost of retraining personnel and other similar expenses as potential damages.

Estimate of Damages

Realistically, it is not unusual for user's damage to exceed by several orders of magnitude the cost of the computer. Further, the damages will increase substantially if the user can show deceptive marketing practices on the part of the vendor and, thereby, receive punitive damages. In any event, it is evident that the potential damages in this type of suit are extremely high.

In one extreme case, a user purchased a computer for approximately $400,000. After several years of complaining that the computer was defective and was damaging its business, the user was forced to bring suit against the vendor.

The vendor had protected itself from potential liability to the user by limiting its damages in the sales contract. However, the user's attorney was able to prove fraud and misrepresentation on the part of the vendor and thereby voided the sales contract and its associated limitation of liabilities clause. The user received a jury verdict in excess of $11 million for damages. The case was subsequently appealed by the vendor and settled for an undisclosed amount.

Clearly, even with the purchase of only software, the stakes are high and justify due precaution on the part of the user.

David J. Connelly is an attorney with Curry & Connelly, Bricktown, N.J.

COMPUTERWORLD can't cover all of Info 80 in **one** issue. That's why we're covering it in **two!**

October 6th — Info 80 Show Issue
October 13th — Info 80 Wrap-up Issue

Computerworld will bring you two-part, total coverage of the most important information equipment show in the East. Info 80 will be held again this year at the New York Coliseum, October 6th-9th. A heavy turnout is assured with a record audience of between 22,000 and 25,000 corporate executives, DP managers and administrative managers—Plus, there'll be more than 200 exhibitors, 250 speakers and 80 sessions.

Computerworld will have up-to-the-minute coverage of Info 80 in our October 6th issue. And in our October 13th Wrap-up issue, you'll read what went on in those four days, compare the best ideas of the best minds in the industry and find out not so much how a product works but what it can do for you.

We also have a booth there, so if you're going, stop by #2523 for a free copy of our Show issue. It'll outline the high points of the show—exhibitors, speakers, special events—along with a guide to night life in New York. Ad closing dates for these two special issues are shown below.

If you're aware of the revolutionary changes taking place in the use of information systems and the impact they can have on your business—you can't afford to miss this two-part total coverage. And if you're exhibiting, be sure to put your ad in both of these issues. Your Computerworld representative can give you full ad planning assistance. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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October 6th Show Issue	September 19th	September 26th
October 13th Wrap-up Issue	September 26th	October 3rd

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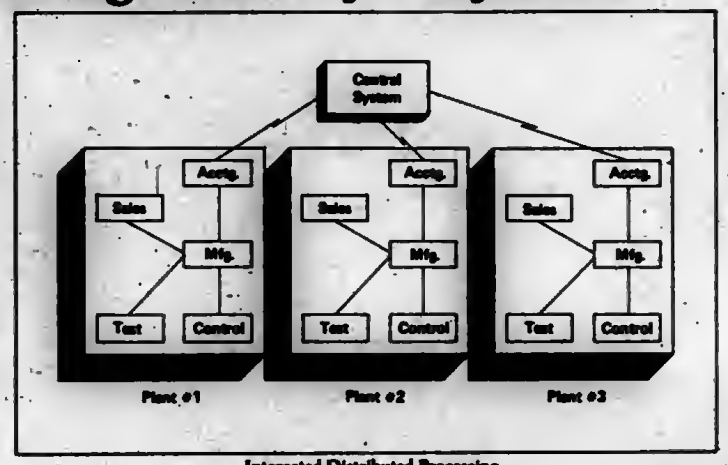
Is DDP Right for You? — Part 2

HP Favors 'Management by Objective'

By Lawrence C. Hartge Jr.
Special to CW

Decentralized management responsibility at the operating level with strong central management coordination — a management-by-objective philosophy — is favored within the Hewlett-Packard Co. organization. Companies with this type of structure and firms that drive profit and loss accountability as far down in the organization as practicality will allow can benefit from distributed data processing (DDP).

This is the last half of a two-part series in which the author outlines five criteria to determine if DDP is viable within various organizational structures. The first two governing criteria — on-line interactive DP and what Hartge calls an "80/20 work load" — were described last week.



Integrated Distributed Processing

In a centralized system environment, divisional managers must accept the central organization's estimation of their computer system costs. However, financial responsibility for the computer can be placed at the divisional level with DDP.

As a result, costs can be directly allocated to the division, and its integrity as a profit or cost center is strengthened. Accountability may be driven even further down the organization if the processing is dedicated by function. This allows areas such as marketing, accounting and production to have maximum responsibility for their computer operations.

No Loss of Control

It is important to recognize, however, that increasing local accountability needs not mean sacrificing central control. Control can be as centralized as is deemed necessary, with a distributed system.

For example, a central location can poll remote sites for data. A network can be configured so that personnel at the central location can activate programs on remote systems without operator intervention. Given the proper password authority, even a satellite can be audited remotely by the central location.

However, an increase in central control is usually accompanied by a rise in communications costs. If economy is a primary interest, the 80/20 rule — 80% of the processing done locally and 20% remotely — should be followed. That is, place the data bases and programs on the systems where they are most used.

Distributed processing has proven to be admirably suited to large companies with a structure consisting of functionally different, organizationally independent geographically dispersed operations. Manufacturing plants, distribution centers and sales offices would be typical examples.

DDP provides flexible and specialized processing for each part of the organization.

Systems can be tailored specifically for each division's applications so that its unique needs are met. The divisions can also exchange information with one another and report relatively inexpensively to the corporate headquarters through a communications network.

Closer scrutiny of possible DDP system configurations indicates that a dispersed company structure is not the only one that can benefit from a distributed network. There are, in fact, two basic system types — one applicable to a dispersed, decentralized environment and the other ideal for a single site. A third type, combining the two, will work in either kind of environment.

Geographical Distribution

First, there is geographical distributed processing. This is the type of system that was initially considered when DDP began to gain popularity. It is characterized by separate geographical sites tied together in an integrated network, often to a central system.

Each computer is dedicated to the same function and a user on one system can both inquire into his own data and interactively access another site's system. The results of the final transaction or summary can be stored locally or forwarded to a corporate

(Continued on Page 62)

Optical Scanner Bypasses Input Step

By Rita Shoor
CW Staff

NEW YORK — An optical scanning system designed to eliminate one of the input steps usually required for automated pattern recognition has been announced here by Auerbach Computer Telephone Corp. here.

Billed as a technology rather than a product introduction and named after its inventor, Dr. Sidney Auerbach, the Auerbach Optical Scanner (AOS) system funnels video images through an analog-to-digital converter and the digitized data stream is then fed into a minicomputer for processing.

The digitized image is then compared to images that are in the "same functional class," according to Auerbach, and, through proprietary pattern recognition software, it is determined into which class the newly input image falls. The results of this determination are then either displayed on a CRT or used to generate a hard-copy report, he said.

Because of bypassing the intermediate input step of graphics plotting or keypunch/CRT data entry that is associated with this type of pattern recognition processing, the system can scan visual images at a rate of 30/sec, Auerbach claimed.

The proprietary software includes programs written in Cobol, Fortran subsets, Interdata, Inc.'s 7/32 assembler language, Taps command language from Decision Strategy Corp. and Digital Equipment Corp. LSI-11 microcode, he noted.

Possible Applications

Although originally developed to aid the medical community with pathology slide and X-ray image identification, other applications such as security identification and industrial quality control could logically be handled by the AOS system, he said.

Signatures, credit cards — even human faces — can be scanned and matched against images within the system's data base, he pointed out.

Any video image camera that generates a standard black-and-white composite can be utilized with the system, according to Auerbach, and currently operating systems are running with scientific minis from both DEC and Perkin-Elmer Corp. with equal success, he said.

Current plans call for offering licenses for sale and manufacture of the equipment through Control Data Worldtech, Inc., the marketing arm of Control Data Corp., he continued.

Fees for viewing and testing the equipment for a three-month period have been set at $1 million while auction bids for nonexclusive licenses for equipment sale and manufacture will start at $50 million, Auerbach said.

Future plans include making a stand-alone version of the system available for approximately $100,000, he said. However, this type of agreement would include a stipulation that Auerbach receive a negotiable percentage of the gross sales achieved through the system's utilization, he added.

Additional information can be obtained from Auerbach Computer Telephone Corp. at 246 West End Ave., New York, N.Y. 10023.

Provides 675M Bytes

Harris Adds Hard Disk Subsystem

FORT LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division has introduced a Winchester technology disk drive subsystem that it said has more than twice the storage capacity of the firm's previous disk systems.

The Model 5660/5661 disk drive provides 675M bytes of random-access storage in a fixed, sealed media drive. Harris' previous maximum disk capacity was 300M bytes, a spokesman claimed.

Besides being a fixed module disk drive (FMD), the Harris offering features a light load, contact start/stop head designed for product reliability and microprocessor-controlled servo mechanism that provides an average seek time of 25 msec. The disk's average latency time is 8.3 msec, yielding a total average access time of 33.3 msec, the spokesman noted.

Transfer Rate

The 5660/5661 has a transfer rate of 9.67 MHz or 1,209K byte/sec and is sold with the firm's UDC. In addition, up to seven FMDs can operate from one UDC.

The price of the disk with UDC is $71,260. Additional storage drives cost $61,860. Deliveries of the disk are scheduled to begin next January, the spokesen said from the company at 2101 W. Cypress Road, Fort Lauderdale, Fla. 33309.

Micrographics Meet Set for California

LONG BEACH, Calif. — The first annual Western Micrographics Conference and Exposition will be held here on Nov. 18-19, according to an Orange County National Micrographics Association (NMA) spokesman. The seminar series featured at the conference will include segments on fundamentals, technology and applications.

R.W. Colbert of the Douglas Aircraft Co. and Paul E. Douglas of Southern California Edison will be on hand to lecture at the conference. Equipment will be on display.

Preregistration for NMA members is $70 prior to the event and $90 on site. For nonmembers, fees are $100 for preregistration and $120 at the door. More information can be obtained from Orange County NMA official Adolphus N. Spence, P.O. Box 1162, Cerritos, Calif. 90701.

Nabs Workshop to Focus On Operations Management

MEMPHIS, Tenn. — An operations management workshop is being offered here by the National Association of Bank Services (Nabs) Nov. 12-13.

Enrollment for Nabs member company representatives is $150 for the first person and $125 for additional persons from the same outfit. Nonmember registration is $200.

Additional information is available from Nabs, Suite 1331, 50 W. Broad St., Columbus, Ohio 43215.

HP Favors DDP Approach

(Continued from Page 61)

machine to update a central data base.

As computing costs dropped and system capabilities increased, it became possible to justify individual computers performing dedicated applications at a single facility.

Technical computers could control the instrumentation and process control functions, as well as manage quality assurance and shipping. The technical processors would be networked to the business-oriented computers. With multiple divisions, these computers, in turn, could be tied into an intrafacility information-sharing network.

Functional DDP has the advantage of allowing each unit to utilize the processing most suited to its needs. No compromises need be made between number-crunching requirements and a need for transaction processing. Instead, the right processor is chosen for each job, and the 80/20 rule is followed to determine where to place the hardware.

Integrated Distribution

The third general category for a DDP system configuration is integrated distributed processing. It combines features of geographical and functional systems. (See diagram on Page 61.)

The intrafacility functional systems in each of a company's plants are linked together as in an interfacility geographical system to form an integrated information network for the whole company. While the integrated system takes advantage of DDP's system tailorability, it requires more planning for successful implementation.

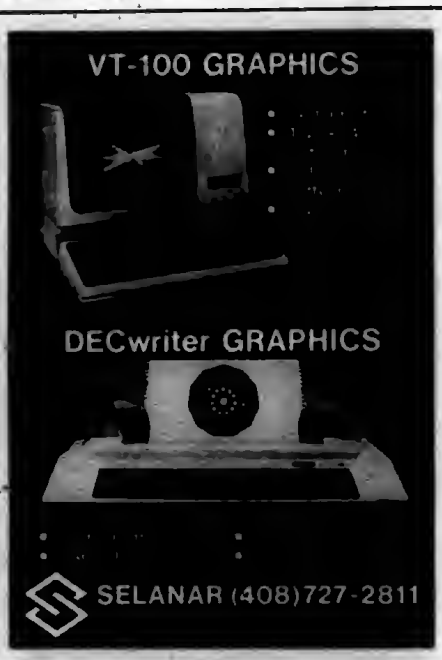
Beginning with remote job entry or source data entry, a firm might move to local data inquiry and update for satellite locations. Although some companies describe this phase as distributed processing, it is mainly directed towards offloading tasks from a central mainframe.

It is not until the next step — functional DDP — that the processing is truly distributed in nature since it is at this point that the computing requirements of an independent functional entity are being fulfilled.

Not only is DDP flexible enough to accommodate different organizational structures, but as these structures grow and change, the DDP network can easily accommodate this growth.

If an organization meets more than one of the five outlined criteria, a distributed processing network may be the right tool for maximum DP flexibility in a high-growth environment.

Hartge is a product manager in data communications for Hewlett-Packard.



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TI825 KSR Printer	1,895	163	89	57
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ADM42 CRT Terminal	2,195	210	117	79
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QUME Letter Quality RO	2,895	278	155	105
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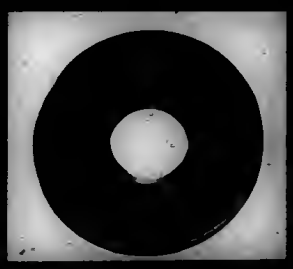

PREMIUM COMPUTER.

When Wisconsin Life added a Level 6 computer their customers were the real beneficiaries.

Not all insurance companies are slow-moving behemoths. Wisconsin Life just installed one of our Level 6 computers and is now processing most claims within 72 hours. Response time has been cut by a full 80%.

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Wisconsin Life is benefitting from something we call Businessware. A well-balanced combination of the right hardware, the right software, and Honeywell's vast business experience.

Everything our salespeople have learned in 25 years of working with businesses has been put into Businessware.

TPS-6 is part of Businessware. Thanks to this built-in transaction processing system, Wisconsin Life's new computer is helping in three key areas. First, linked to a network of 60 terminals, it's making clerical functions easier to perform.

Clerks now use terminals to check the nuts and bolts of individual claims: Is this policy valid? Has this claim been paid before?

In all, there are more than 30 screen formats.

Once a claim has been approved, a check is written that night. Since the Level 6 arrived, many claims have been paid in a single day.

The Level 6 has also been helping Wisconsin Life develop new applications for their transaction processing capability. For instance, there's a program in the works now that will enable them to process all new business on-line.

One advantage is that the computer can be used to calculate premiums, thus eliminating a great deal of work currently done by hand.

Finally, the Level 6 runs a very efficient data entry facility. Once CRTs are installed, clerks will be able to correct errors immediately, substantially reducing overall system maintenance costs.

Services Improved.

Wisconsin Life's new Honeywell is doing precisely what we knew it would. It's giving them greater control of their operations. And in so doing, it's increasing the quality of service Wisconsin Life offers their customers.

On Wisconsin!

For a more detailed look at the Level 6, write Honeywell, 200 Smith Street (MS 487), Waltham, MA 02154.

Honeywell

The HP 3000 has established a 99% availability rate during the last year of operation; Syncrude Canada has saved $1.2 million a year in inventory alone since its installation.

Syncrude Canada uses terminals throughout its warehouse area to gain instant access to the computer, which helps keep track of a $40 million inventory.

Oil Inventory System Replaces File Tubs

Special to CW

MILDRED LAKE, Alta. — Before Syncrude Canada, an oil research and exploration firm here, replaced its manuls inventory system with a computer-based system, the company's primary recordkeeping tool was tubs of files.

When spare parts or equipment for its oil extraction machinery were needed, employees would pull the files from the tubs and transcribe the transactions manually into general ledgers.

Today, however, the company uses a Hewlett-Packard Co. 3000 minicomputer system to keep track of the 65,000 inventoried items valued at about $40 million, as well as monitor the purchasing of approximately $2.5 million worth of equipment each month.

The firm's material handling system saves the company $1.2 million a year in inventory costs, according to Harley Bricker, a superintendent at Syncrude.

'Fast Response'

"The system gives fast response to maintenance personnel inquiries, more realistic availability information, shorter lead time for procurement and faster delivery," Bricker claimed. The HP-3000-based system also provides better use of the firm's production facilities and supporting services, as well as more creative use of management time.

Syncrude is not the usual oil-drilling operation. The company deals in a form of strip mining that extracts a mixture of heavy oil, called bitumen, and sand which is soaked with the rich oil.

The sand is put through an upgrading process that extracts the bitumen which is then pumped to refineries in Edmonton, Vancouver, B.C. and Montreal for further upgrading. After this final process, the refined products are marketed for consumer use, Bricker said.

Stored in about 23 million cubic feet of warehouse space are the spare parts and materials for the equipment needed to keep the oil flowing. The company's Materials Management Division handles this multimillion-dollar inventory and its job to ensure that stocks are kept at a proper level.

They also respond to various

(Continued on Page 68)

Links 16 Users

Multiprocessor Micro System Bows

BOSTON — A microcomputer-based multiprocessor computer system that is said to provide up to 16 users with an independent operating system to eliminate response lag and simplify debugging has been introduced by Computer Service Systems Network, Inc. (CSSN).

The System 1000-MP links users via an S-100 bus and is expanded by adding single cards that contain a processor, memory and dual port memory windows. Specialized cards that provide high-speed communications are also available, a spokeswoman stated.

Built around a Z80A processor, the CSSN computer supports up to four Winchester 8-in. hard disks with a maximum 96K bytes of storage. File backup is maintained on a tape cartridge drive.

The system has a hard disk operating system that is upwardly compatible with Digital Research, Inc.'s CP/M 1.4 and can run a variety of industry standard languages and applications.

The four-user System 1000-MP with 24M bytes of storage costs $25,000 and is available in a desktop or rack-mountable version. CSSN is at 120 Boylston St., Boston, Mass. 02116.

Disk System for DEC Users Takes Floppies, Winchesters

MOUNTAIN VIEW, Calif. — Scientific Micro Systems, Inc. has introduced a microcomputer-based floppy and Winchester disk system that is compatible with Digital Equipment Corp. hardware and software and has four RS-232C connectors for input or output devices.

The Disk System 11X includes a DEC LSI-11/2 or 11/23 CPU with up to 128K bytes of random-access memory and up to 2M bytes of floppy disk storage in a single tabletop enclosure.

Storage can be expanded by the addition of a 26.4M-byte 14-in. Winchester drive option, a spokesman noted.

The disk system is compatible with standard DEC RT-11 and RSX-11M operating systems. The addition of dual-head floppies is said to double the storage normally available when running the RT-11 operating system available on DEC RX02 floppy diskettes.

The unit also has a 40% faster

(Continued on Page 68)

And DASI gives you ultimate flexibility.

One Source Responsibility. DASI has everything you'll need, ready for immediate delivery, starting with the Hewlett-Packard 2621A and 2621P terminals. These are simple, reliable, quality interactive terminals. The 2621P also adds an integral thermal printer, combining the convenience of local hard copy with the speed of a video terminal.

Plus—Both HP terminals have two full pages of memory for quick reference. Memory contents are viewable either page-by-page or by scrolling. On the 2621P, upper/lower case letters, control codes and underline are printed on thermal paper at 120 characters per second. And, even in character mode both models allow editing before transmission.

See us in the FDC, Booth #1208/1307

Selection. DASI also has the full line of CRT's from Lear Siegler*, Hazeltine*, Digital Equipment Corp. and Datamedia, and all the complementary hard copy printers from TI*, Diablo* and DEC. High-speed modems such as the 212A or Vadic compatible acoustic couplers provide you with the communications speed you need.

Service. DASI maintains the equipment it sells nationwide. Your HP terminal and modem combination will be serviced by one source who stocks the parts and has technicians available for fast response.

Financing. For more information on DASI's capabilities, including leasing, equipment, service and supplies, call your local district office, or toll free (800) 257-7746, in N.J. (800) 232-6510.

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Turnkey Accounting System Features Report Writing

LOS ANGELES — A turnkey Client Accounting and Bookkeeping System (Cabs) to meet the needs of accountants is available from The Briareus Corp.

The system features a report writing capability that includes income statements, balance sheets, statements of changes, sales analyses and other reports an accountant may need, the vendor claimed.

A variety of client-oriented programs are possible with Cabs, such as automatic arithmetic allocation.

The system is available in four basic hardware configurations ranging in cost from $25,000 to $57,000, the vendor said from Suite 302, 1801 S. La Cienga Blvd., Los Angeles, Calif. 90035.

HP 2100 Gets Interface

SAN DIEGO — Innovative Data Technology has introduced the TDC-3011 interface for its TDC-3000 digital cartridge drive. The interface reportedly occupies one card slot in the Hewlett-Packard Co. 2100 series of minicomputers and connects to the cartridge drive via a 40-wire flat ribbon cable.

The TDC-3011 costs $1,800 from Innovative Data Technology, 4060 Morena Blvd., San Diego, Calif. 92117.

PE Offers CAD/CAM Line Based on 32-Bit Minis

OCEANPORT, N.J. — Perkin-Elmer Corp. is offering a series of mechanical design and drafting systems based on the firm's 32-bit minicomputers and using software supplied by Manufacturing and Consulting Services, Inc. of Santa Ana, Calif.

The preconfigured systems utilize PE's 3220 or 3240 minicomputers and can support up to 12 workstations.

The AD-2000 computer-aided design and manufacturing (CAD/CAM) software is menu-driven and provides five separate but fully integrated sets of capabilities that include computer design, total tool design and numerical tape production, annotated drawings, a comprehensive management information system and a compatibility with most existing design applications software, a spokesman stated.

Dimensional Accuracy

The software is said to provide a dimensionally accurate data base that can be used for all phases of design, drafting and manufacturing, he added. In addition, PE provides its Fortran VII software as a separate facility that can be used for program development or other manufacturing functions.

The entry-level 3220-based system is priced at $179,000 with two workstations, while an expanded model with three CRT terminals and more disk storage space costs $251,000. The high-end 3240 version sells for $300,000.

PE is located at 2 Crescent Place, Oceanport, N.J. 07757.

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To find a local distributor call us toll free at (800) 538-1793 (from outside California) or collect at (408) 737-7771 (In California).

Verbatim

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The 5¼" 50-File protector (normally $29.95) is now only $10.95 with the purchase of 50 Verbatim minidisks.

Offer limited to stock available.

Entry-Level CPU Provides WP

WESTLAKE VILLAGE, Calif. — An upgradable entry-level computer system offering word processing (WP) and list management capabilities is available from Vector Graphic, Inc.

Designed for business users and software developers, the system, termed the Vector Intelligent Partner (VIP), is based on the Vector 3, an integrated video console with built-in S-100 electronics.

The system's single 315K-byte minidisk drive is housed separately, allowing addition of up to three more identical drives, or replacement by Vector 2 Dualstor diskette unit, the 30M-byte Megastor Winchester drive or other future Vector units, the vendor claimed.

The price for the VIP is $3,695 from Vector, at 31364 Via Colinas, Westlake Village, Calif. 91362.

MIC Study Asks User Help

CHERRY HILL, N.J. — Management Information Corp. (MIC) is inviting vendors and user groups to participate in five annual surveys that focus on six different DP products.

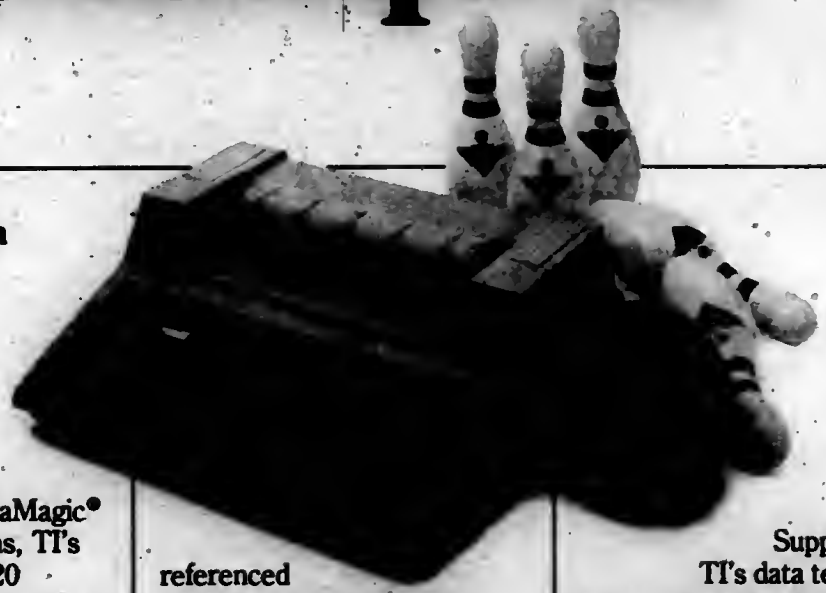
The MIC surveys concentrate on small business computers, data entry equipment, packaged business software for micro- and minicomputers, data communications, distributed processing equipment and word processing systems.

Vendors and user groups can distribute questionnaires to system users or they can be circulated by MIC. Organizations assisting the research firm will receive complimentary copies of the respective newsletter containing the survey findings. As in past surveys, respondents can elect to remain anonymous.

Finally, companies whose products are highly rated, and for which sufficient responses are received, will be presented with a Certificate of User Commendation, a spokesman noted.

Specific information on the questionnaire distribution program as well as on each of the surveys is available from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

League Champion.



AMF scores with TI's 820 KSR.

Teamed with AMF's MagicScore® and DataMagic® computerized systems, TI's OMNI 800* Model 820 Keyboard Send-Receive Data Terminal offers bowlers full league secretarial services. Within minutes after a match is completed, this desktop model prints out updated team standings, scores, averages and number of games played, all at a responsive 150 characters-per-second. And the 820 KSR's clear, multiple copies make it easy for both managers and bowlers to reference league reports.

The 820 KSR is also a valuable promotional aid. With its easy-to-use typewriter-like keyboard, proprietors can enter collected demographic information about bowlers. Stored in the host computer, the information is easily referenced through printouts provided by the 820 KSR. And with flexible options like forms control, the versatile 820 KSR can be used to generate labels for mailings to selected bowlers when tournaments or new leagues are forming.

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For more information on the 820 KSR, contact the TI sales office nearest you or write Texas Instruments Incorporated, P.O Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016. In Europe, write Texas Instruments, M/S 74, B.P. 5, Villeneuve-Loubet, 06270, France.

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TEXAS INSTRUMENTS

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Oil Firm's Inventory System Replaces File Tubs

(Continued from Page 65)
work orders from the maintenance staff, handle equipment requests from the operating staff and order new parts and equipment when necessary, Bricker explained.

The Division's HP-3000 has 1M byte of memory, six 30M-byte disk drives, two 1,600 bit/in. tape drives, 50 CRT terminals, eight Digital Equipment Corp. Decwriter printers and a number of slave printers.

Specifically, the system handles eight computer applications: inventory control, bill of materials, master schedule, work-order control, purchase-order control, accounting control and two special manager routines.

Syncrude selected its present computer and software by using a selection process based on both required and desired system features. This method, called the Kepner-Tregoe system, indicated Syncrude required an on-line system easily operable because of limited programming expertise from within the company.

A list of 86 potential systems was narrowed to three. The firm finally chose a material handling system developed by the Electronics Support Division of Boeing Aerospace with the HP-3000 at its heart, Bicker pointed out.

Operations Procedure

When a new piece of equipment is received, it is broken down into the smallest possible number of component parts and entered into the bill of materials, Bicker stated, describing the system's operations. An on-line query can then determine exactly what replacement parts are required.

When an order for a part is received, all pertinent information — material requirement, work order number, order data, required date, equipment number and quantity — is entered into the master schedule.

A material requisition is run to determine whether or not the required part is in stock. If the item is not available, a purchase order is generated and an order placed.

When the item arrives from the supplier, the quantity received is entered into the computer and checked against the quantity ordered. If a discrepancy exists, a discrepancy report is issued, enabling the supervisor to determine the cause of the difference and correct the problem.

The part is then moved to the receiving dock where it is assigned a storage bin. The location of the part or the warehouse floor is now entered into the computer.

When a request for parts is made, the order is entered via a CRT terminal, and a "pick tag" is generated that informs the warehouse of the location of the required items and the number needed.

When the invoice arrives from the supplier, the accounts payable department in Edmonton keys the new price item into the computer, thereby updating the pricing on all like items in inventory.

On-Line Approach

According to Bricker, the on-line approach, which uses HP's Image data base management system, is the key to Syncrude's successful operations. The fifty terminals located throughout five warehouses, the materials management offices, the maintenance planners offices, and the data center provide almost instant access to the computer. Even during peak usage, the terminals help ensure that machinery is maintained and repairs are handled as quickly as possible, he commented.

The HP 3000 has established a 99% availability rate during the last year of operation. The 1% down time includes the regularly scheduled maintenance, Al Walker, Syncrude's manger of systems and computer services, said.

Clerical access and input is facilitated by HP's Query, an English-language type program which allows direct access to the computer and also helps edit the data input to assure that it is correct. Programming is in Fortran, with some use of Basic.

Since the computer's installation "We have achieved better use of our production facilities and supporting services," Superintendent Bricker claimed.

"Management time is now used in more creative ways, because there is less data to handle."

System Based on LSI-11

(Continued from Page 65)
disk access speed than DEC single-head floppy disk drives.

The unit uses the firm's proprietary controller, code-named Flinchester, to interface between the LSI-11 Q-bus and both floppy and Winchester disks.

Two modes of operation are possible: a compatible mode that provides complete RX02 hardware, software and media compatibility; and an extended mode that is utilized with an appropriate device handler to access the Winchester and IBM-compatible floppy disk drives.

The extended mode is also said to increase throughput because of high-performance direct memory access interface operations. Rather than transferring only one disk sector per command, up to 65K-byte data blocks can be transferred by a single command.

Prices for the 11X with LSI-11/2 CPU start at $7,400, while costs for the system with an LSI-11 start at $9,995. Add-on Winchester storage prices start at $3,800.

Scientific Micro Systems is at 777 E. Middlefield Road, Mountain View, Calif. 94043.

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Display Interfaces Offered For Q-Bus, Unibus Systems

OAKLAND, Calif. — A line of direct-access alphanumeric and graphic video display interfaces for the Q-Bus and Unibus structured systems of Digital Equipment Corp. LSI-11 and PDP-11 minicomputers has been announced by Peritek Corp.

The Viuram family of color and monochrome interfaces was designed for use in highly interactive systems, process control information displays and applications requiring rapid update of screen information, Peritek said. It can also be used for applications that combine interactive portions of the monitor screen with real-time background display in split-screen formats, such as in laboratory and control room settings, the firm said.

On-board video memory appears to the host CPU as full speed main memory, receiving character, attribute, pixel, color and control information from operating software in the form of high speed, direct memory reference.

The interfaces employ on-board memory in a dual-port, transparent design, "thereby creating no CPU contention problems," according to the spokesman.

Prices range from $475 to $2,000 from the firm at 3014 Lakeshore Ave., Oakland, Calif. 94610.

The Viuram Video Display Interface

Burroughs CPUs Get Printer

GAITHERSBURG, Md. — Printer Systems Corp. (PSC) has introduced a plug-compatible serial matrix printer for Burroughs Corp. processors that emulates Burroughs' 9249-1, 2 and 3 printers.

The T-1602 printer, a Tally Corp. machine, can be shared with up to three CRT stations on a nonpriority daisy-chain cable and is linked to the CRT terminals via an included interface that is said to permit screen image printouts under operator control.

The printer has a 132-col bidirectional print mechanism with a 96-char. Ascii set, and prints six line/in. and 10 double-width char./in. The device has a slew speed of 8.5 in./sec on a 4-in. to 15-in. paper width.

The printer costs $2,695 from PSC at Suite 104, 1 W. Deer Park Road, Gaithersburg, Md. 20760.

HP 2619A Runs On HP 1000s

PALO ALTO, Calif. — Hewlett-Packard Co. is now offering its fastest line printer, the HP 2619A, for use on HP 1000 technical and industrial systems. It was formerly available with HP business computers only.

The printer uses horizontal chain technology and prints 132 columns of a 64-char. set at 1,000 line/min or 750 line/min with a 96-char. set, the vendor claimed.

The printer is fully compatible with HP 1000 computers of the M, E and F series and costs $23,000, HP said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Micro Meshes Pascal With DEC's Q-Bus

SAN DIEGO — Advanced Digital Products has announced a microcomputer that combines Pascal with Digital Equipment Corp.'s Q-Bus.

The unit is a 16-bit processor with a bus-compatible backplane that will accept up to 14 Q-bus memory modules, the vendor said.

Called the PDQ-3, the unit was built around the UCSD Pascal compiler. The MPU features a 16-bit stack processor, a real-time clock and a DMA floppy disk controller, the vendor said.

The unit costs $6,495 from the vendor at 7584 Trade St., San Diego, Calif. 92121.

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For more information on RAYNET/II or other RAYNET family members, call the RAYNET marketing director at (800) 225-9874. In Massachusetts, call (617) 339-5731.

Monthly line costs are lowered by the remote line concentration capability in RAYNET/II systems. Lowering communications overhead on host mainframes is another of the ways RAYNET/II processors can improve your network. The network is decoupled from the hosts, and communications functions are handled directly.

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For 8-Bit, 16-Bit MPUs

Pascal Compiler One of Intel Debuts

SANTA CLARA, Calif. — Intel Corp. has introduced a number of products ranging from a multiuser development system to a Pascal compiler for programmer support for its 8-bit and 16-bit microprocessors.

The Model 290 Intellec disk file sharing system or Network Development System-I (NDS-I) is said to enable up to eight development system users to simultaneously share files on one or two hard-disk drives providing up to 15M bytes of central, shared storage capacity. Present Intel stand-alone development systems can be used as entry points to the networked system.

The NDS-I is reportedly the first multiuser distributed program system offered by the California-based firm.

The major component of NDS-I is the network manager which controls communications between the system's work stations and the shared hard disks, a spokesman noted. One or two fixed disk drives are hard-wired to the network manager. Workstations can be located up to 20 feet apart and up to 120 feet from the network manager.

The system also includes a communications manager that monitors the activities of the eight workstations, a message manager that maintains a table of logged-on users and a file manager that creates, reads, writes and deletes files on the shared hard disk.

With the multitask operating system, the NDS-I costs $25,105. Workstations are priced at $1,100 each. Users who are already have the firm's models 240 or 245 development systems can purchase just the network manager and interconnect kit for $2,180.

All of these products will be available at the end of this year, the spokesman pointed out.

Intellec Family

The second offering is a family of Intellec microcomputer development systems tailored for Intel's iAPX-88/86 applications. The Intellec Series III supports a variety of high-level languages and supports structured, modular programming.

The Intellec Series III

The Series III can address up to 1M byte of system memory and contains a CRT with detached keyboard, an integral floppy disk drive, power supply and cables.

The system costs $16,500. However, users fo the firm's current Series II development system can purchase a Series III upgrade kit for $7,500. Both products will be available this month.

Finally, the Santa Clara company unveiled a Pascal-86 compiler for its iAPX-88/86 family of microprocessors that runs on the Intellec Series III or any other Intellec development system.

The compiler produces relocatable machine code directly from a programmer's English-like source code. The software also allows users to port Pascal programs and employ a compiler-time option that lets the compiler flag end-use of a programming extension.

The diskette-based software, user's guide and pocket reference manual costs $4,000 and is scheduled for delivery at the end of this year.

Additional information on these and other Intel products is available from the company at 3065 Bowers Ave., Santa Clara, Calif. 95051.

one for the files.

A Computerworld Special Report on Data Base Management Systems in our October 27th issue.

This special report will explore many of the issues relating to the selection, implementation and organizational impact of DBMS software. It will include:

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Columbia MPUs Get Graphics

COLUMBIA, Md. — The Model 900 Commander microprocessor system from Columbia Data Products now offers comprehensive graphics display capability in a desktop configuration.

Bar charts, pie charts, histograms and point-to-point plots can be displayed with the 900's self-contained vector and point plotting features.

The Commander 900 provides dual independent Z80A processors, 96K bytes of random-access memory and dual floppy drives.

The Commander 964 — Columbia's most common model — costs $5,375 from the firm at 9050 Red Branch Road, Columbia, Md. 21045.

TRS-80, Apple MPUs Get 8-In. Disk Drive

MANHATTAN BEACH, Calif. — Matchless Systems, Inc. has unveiled an 8-in. disk drive compatible with Radio Shack, Inc. TRS-80 models I and II and Apple Computer, Inc. Apple II and S-100 systems.

The MS-800 has a capacity of 77 tracks, 26 sectors per track, 128 bytes per sector — for a total of 256K bytes. That is 2.2 times the capacity of the Apple 5.25-in. drive, the vendor claimed.

The price range of $995 to $1,595 covers all hardware, software and documentation, the vendor said from 18444 S. Broadway, Gardena, Calif. 90248.

CI Notes

Datapoint Christmas Gift: Competitor to IBM 3033?

Datapoint Corp. is expected to announce a mainframe in the IBM 3033 class before Christmas. According to industry sources, the large-scale machine will have a memory of 1M byte or larger and a peripheral processor unit.

The CPU will be able to operate on a stand-alone basis or within Datapoint's Attached Resource Computer (ARC) environment, the sources added.

Moreover, Datapoint will also announce a new high-technology operating system with resource transparency, they said.

Braegen Charges Calcomp With Misrepresentation

SANTA ANA, Calif. — Braegen Corp. has sued California Computer Products, Inc. for more than $42 million, charging Calcomp with misrepresenting the financial status of its IBM plug-compatible memory division, purchased by Braegen last year.

Calcomp said it will file a countersuit early next month.

Braegen's suit alleges Calcomp claimed the division was operating at the break-even point and misrepresented certain warranties and the supply of spare parts. Braegen said it would not have purchased the division if it had known of the losses.

Since the acquisition, Braegen claimed it has lost $3 million in operating that portion of its business.

STC Offers $52 Million To Acquire Documation

MELBOURNE, Fla. — Storage Technology Corp. (STC) recently offered $52 million to acquire Documation, Inc., a financially troubled printer manufacturer here.

Based upon the letter of intent, Documation shareholders would receive .85 shares of STC for each Documation share. The exchange rate would be based on the $20 closing price of STC common on Aug. 29.

The agreement further calls for the assumption by STC of $50 million worth of Documation long-term debt. If the merger is approved by the boards of both companies, Documation would become a wholly owned subsidiary of STC. The transaction could be completed by early November, Documation said.

Although a significant factor in the printer market, Documation last year lost more than $10 million on sales of $58.7 million.

Carter's Tax Credits Held Not Much Help to Vendors

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — While President Carter's new economic incentive program — broadening investment tax credits — may be a boon to computer users [CW, Sept. 9], it doesn't offer very many advantages to vendors.

Why? Much of the equipment used to manufacture computer components will have to be replaced to exploit new technology before it can be fully depreciated, according to Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association (Cbema). This is despite the fact that a major thrust of the new economic incentives program is to promote innovation in high-technology industries.

"Aside from a number of specific initiatives ... to enhance collaborative research among universities, industry and government," the Administration plans to "develop and expand programs to assist ... small high-technology firms."

This latter effort will include "expanding the National Science Foundation small business innovation research grant program that provides seed money for research on concepts not yet ready to compete for venture capital," the proposal said.

According to Henriques, however, the Administration would accomplish far more by granting tax credits for research and development investments made by high-technology companies. He cited as a model a bill recently introduced in the House by Rep. Charles Vanik (D-Ohio). This measure, H.R. 6632, would provide a nonrefundable

(Continued on Page 73)

European PTTs Viewed Likely To Lead World in Public Nets

By Graham Bunting
Computerworld/UK

LONDON — The European postal, telephone and telegraphs (PTT) rather than the U.S. network operators and would-be operators are "in a strong position to take leadership in the field of public data works in the next few years," according to Phillip Hughes, chairman of Logica, a leading UK systems house and consulting firm here.

These words were part of the introduction of a report the firm completed recently for Eurodata Foundation — an arm of the European PTTs — a report that estimated the growth of public data networks in Europe from just under 400,000 in 1979 to about 1,620,000 in 1987.

The U.S. operators are often "hamstrung by legal proceedings like Ma Bell, which is still stuck in the courts," Hughes said. Hughes also cited the "superiority of the French Transpac" packet-switched network and its Europe-wide derivative, Euronet; the Nordic network's "world lead in circuit switching"; and the fact that "X.25 is essentially a European standard."

The report contained a number of surprises, according to industry observers.

First is the amount of data communications equipment actually installed today. This turns out to be twice that predicted by the first Eurodata study, which was carried out in 1972. The study talks in terms of num-

(Continued on Page 74)

Seminar Vendors Feeling Pinch Of Recession

By Connie Winkler
CW Staff

NEW YORK — Seminars and workshops designed for DPers are feeling the recession's pinch — all, that is, except for those covering this year's hot topics like telecommunications, productivity and structured programming, office automation and distributed processing.

- Last year a disaster recovery seminar drew 170; this year in Washington, D.C., only 70 are registered.
- A Connecticut education firm scheduled 10 workshops this year on "manag-

(Continued on Page 76)

Instant Cure for Computer Indigestion

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Impact of Amhahl Move 'Potentially Massive'

WALTHAM, Mass. — What will be the effect of Dr. Gene M. Amdahl's departure from Amdahl Corp. to start a new company that hopes to compete head-on with IBM's expected H series of mainframes?

In the short term, the effect will be minimal — Amdahl reportedly had not been active in the company for more than a year.

The long-term effect, however, is "potentially massive," according to International Data Corp.'s Information Industry and Technology Service (IITS).

In a recently issued report, the IITS explained that "with another competitor in the market for [IBM 3033-size mainframes], those most likely to lose market share are the other [plug-compatible mainframers] rather than IBM."

Personnel May Leave

As for the effect of Amdahl Corp. itself, "Cliff Madden, the chief financial officer, has already thrown his hat into Gene's ring. The lure of designing something new cannot be underestimated," the report observed.

"Amdahl Corp. appears to have been essentially in a holding pattern for some time with regard to systems design, concentrating on countering or besting IBM software/firmware code. Will these people be at Amdahl Corp. when it needs them to counter H?" the report speculated.

Moreover, "Amdahl once portrayed itself successfully as the young American company that dared to become the first [plug-compatible mainframer] and challenge IBM. But with recent events such as the axing of the Amdahl-Storage Technology Corp. [STC] merger, Amdahl's departure leaves the public staring squarely into the eyes of a Japanese-controlled company.

"Fugitsu owns about 26% of the stock and is increasing its share in a recent stock offering. With the distinct possibility that protectionist 'buy American' feeling is rapidly mounting in the U.S., the Amdahl-Fujitsu bond could be a problem that is not easily solved by fancy software code."

Noting that it took about $45 million to develop Amdahl Corp.'s first machine, the 470V/6, the IITS report gave an emphatic "You bet" to the question of whether Amdahl could find the $50 million to $100 million financing necessary to deliver an H series competitor.

"He's proven himself — twice — once within IBM's womb and once on his own," the report recalled. "After having had to go into hock with the Japanese the first time around, you better believe the stock market won't let that happen again."

Among the likely bankrollers:

- Amdahl himself.
- Jesse Aweida and STC. Noting that Amdahl resigned from Amdahl Corp. the day after STC "went to the money market," IITS asked, "Coincidence?"
- "John Q. Public and venture firms, banks, etc.," which IITS expects to provide backing after privately raised capital is consumed.

If Amdahl decides not to go it alone, IITS suggested some companies that might be inclined to help him:

- STC, which acquired a custom chip manufacturer, Microtechnology Corp., last year "and has been amenable to linking with a mainframer — witness its unconsummated merger with Amdahl Corp." this year, the report said.
- National Semiconductor Corp., whose "Charlie Sporck is forever berating the lack of quid pro quo re tariffs with the Japanese." However, IITS noted, National Semi's National Advanced Systems Corp. has signed an agreement with Hitachi Corp.
- Intel Corp., whose acquisition of MRI Systems Corp. sparked talk of a data base machine and "might be interested in participating in the mainframe market, if only in subassembly."
- Wang Laboratories, Inc. "An Wang has reiterated his statement that Wang will have a system in the 3033-size class," IITS said. "But it cannot get its VS 100 out the door. So that might be a long-shot linkup."

The report was issued as part of IITS' continuous information service. More information about the service is available from Internationl Data Corp., 214 Third Ave., Waltham, Mass. 02154.

H Series Rival: How Soon?

WALTHAM, Mass. — How quickly will Dr. Gene M. Amdahl be able to deliver a competitor to IBM's anticipated H series of mainframes?

"Probably fairly fast — if the very large scale integration technology is in place" is the prediction contained in a report issued by International Data Corp.'s (IDC) Information Industry and Technology Service.

Amdahl, who has announced his resignation from Amdahl Corp. and his intention to start a new company [CW, Aug. 25], "has gained a lot of experience on the last round — getting financing, designing, really getting a company up and running — and encountering curve balls from IBM in the form of the [370/158]. IDC predicts he can deliver product within about two and a half years," the report said.

But, it noted, "the more important question is how long after H is shipped will he deliver? Probably between six and 18 months. IDC is saying first H shipments about third quarter 1981, so that makes Amdahl's shipments about second half of 1982. Amdahl is saying sometime by 1984."

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Sales Expected to Double by 1985

Memorex Beefing Up Drive Into OEM Market

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. — After years of focusing its attention almost exclusively on end users, Memorex Corp. is at last making its first concerted foray into the computer industry's other major business sector, the original equipment manufacturers (OEM) market.

OEM sales today account for only 15% to 20% of Memorex's overall revenues, which this year will total about $800 million. But by 1985, the OEM share of Memorex's combined sales will have ballooned to approximately 50%, according to William Bayer, president of the company's Peripheral Equipment Group.

Memorex's drive to increase its penetration of the OEM sector took another apparent step forward late last month when the firm announced its decision to make its Model 3652 disk storage subsystem available for the first time to OEMs. The 1.27G-byte Model 3652, a double-capacity version of the IBM 3350, had previously been sold only to end users.

OEM Workshops

Word of the 3652's debut as an OEM product came Aug. 26 at Memorex's first OEM press conference. The announcement also coincided with the start of a series of OEM customer workshops scheduled to be held here and in five other major U.S. metropolitan areas.

Sponsored jointly by Memorex and Microcomputer Systems Corp. (MSC) of neighboring Sunnyvale, Calif., the series will consist of six day-long workshops aimed at schooling OEM buyers in the use of Memorex's Model 101, an 8-in. rigid disk unit, and its accompanying controller, MSC's Micromodule 9000. The first workshop in the series took place Aug. 26 at Memorex headquarters and will be followed later this year by similar meetings in Boston, New York, Dallas, Los Angeles and Chicago.

As a result of the Aug. 26 announcement, the Model 3652 has become the seventh disk drive system to join Memorex's OEM product line during 1980. The first member of that line was added earlier this year with the introduction of the Model 101, an 11.7M-byte Winchester-type disk unit.

Since then, Memorex's OEM disk system family has gained several additional members, including:

- The Model 677-30, a 300M-byte, direct-access system with removable media and a storage module drive interface.
- The Model 612, a modular Winchester-type unit incorporating a choice of 28M-, 56M- and 84M-byte drives.
- The Model 659, a 677M-byte, single-spindle version of the 3652.
- The Model 102, a 23.4M-byte, double-capacity version of the Model 101.
- The Model 201, a 25M-byte disk system offering both fixed and removable 8-in. media.

Although Memorex has a long tradition of dabbling in the OEM sector, this year marks the first time in its history that the company has pursued the non-end-user market in earnest, Bayer said.

Memorex's decision to greatly expand its activities in the OEM field in no way signals a weakening of the firm's long-time commitment to the end-user arena, Bayer said. Nor does it reflect a major realignment of the company's product line.

The shift in the company's market emphasis means merely that Memorex is beginning to seek new channels of distribution for its existing products and for the underlying technology it originally developed for end users, Bayer explained.

Twofold Rationale

The rationale behind the company's intensified OEM push is twofold. First, an expanded OEM presence promises to bolster Memorex's sagging sales and lessen its vulnerability to IBM's harmful pricing and market actions.

Like many other suppliers of large-scale systems hardware, Memorex during the last year or so has suffered serious financial setbacks at the hands of IBM, whose industry dominance allows it to keep disk and tape system prices in the end-user sector artificially low. In the OEM market, however, Memorex's risk of succumbing to the same financial reversals is relatively slight, primarily because prices in that arena are set by customer demand, not by IBM, Bayer said.

The other important motive behind Memorex's increased OEM business thrust is a desire to take advantage of major new growth opportunities. As an OEM vendor, Memorex will shift its attention from the large-systems sphere, the company's traditional bread-and-butter sector, and concentrate instead on the high-volume minicomputer and microcomputer arenas.

That Memorex chose this time as the moment to make its transition from a large- to a small-systems orientation is no accident.

The minicomputer and microcomputer fields rank among the computing industry's fastest growing market sectors, with an estimated 30% to 50% and 50% to 90% annual growth rate, respectively.

The large-systems sector, by contrast, is expanding each year at only a comparatively modest 10% to 15%, Bayer said.

Tax Credit Won't Help Vendors

(Continued from Page 71)

credit to a company which contributed to a college- or university-directed R&D program.

The credit would amount to 25% of the contribution and would be limited to 5% of the firm's business income. A related Senate measure, S. 2906, would grant companies a tax credit for increases in their internal R&D investments above a previously established base amount.

Henriques is also unhappy with present Internal Revenue Service rules concerning R&D expenditures of U.S. companies that operate abroad. Even when all of this money is spent in the U.S., he explained, the government requires part of the expenditure to be charged to the foreign subsidiary — which means a smaller deduction on the parent company's U.S. income tax return.

"We don't believe the Administration's plan to participate directly in private sector R&D activity will be nearly as effective as encouraging companies, through tax incentives, to spend more of their own money," Henriques added.

"The regulations and paperwork generated by a partnership with the government discourage most of the prospective private partners. Also, the government is almost always interested in promoting social objectives — such as increasing employment or reviving failing industries — and this tends to direct money away from those R&D areas that could be most fruitful in terms of technological innovation."

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European PTTs Seen Likely To Take Lead in Public Nets

(Continued from Page 71)

bers of network termination points (NTP), the point of connections of the user's equipment (usually via a modem) and the PTT transmission facility.

The number of NTPs is put at 393,000, accounting for some 3% of the total revenues of the PTTs in Europe. In the UK last year this amounted to some $480 million.

The second point of major interest is the anticipated growth rate over the next seven years, observers indicated. Four million terminals using data communications will generate something like 20% of the annual revenues of the European PTTs to give total revenues of $6 billion compared with $2 billion in 1979 — a fourfold increase.

"British Telecom and all the other PTTs and manufacturers of terminals and computers are going to have to run much faster than they are used to to keep up with the pace of demand that is being forecast," remarked Tim Johnson, of Logica.

"In the UK alone, British Telecom is going to have to install another 260,000 modems or other data connections, compared with around 120,000 in 1979, and the terminal manufacturers are going to have to provide 730,000 more terminals — nearly four times as many as there are data communications users in the whole of the UK today."

	1979	1987
Austria	4,400	38,400
Belgium	6,500	64,000
Denmark	12,000	46,600
Finland	7,000	38,100
France	84,100	341,000
Greece	630	7,170
Ireland	960	6,420
Italy	46,000	125,000
Luxembourg	640	2,800
Netherlands	16,500	74,200
Norway	6,640	24,900
Portugal	704	7,740
Spain	28,000	121,000
Sweden	26,000	82,000
Switzerland	16,500	47,000
UK	117,000	377,000
West Germany	61,700	238,000
Western Europe	393,000	1,638,000

Installed European Net Termination Points

The biggest surprise in the report is perhaps the share of the market which is likely to be taken by public data networks by 1987: from a combined total of 3% in 1979, circuit and packet-switched networks will have taken 30% of the much larger market by 1987 with a total of nearly half a million connections.

This demand will in many cases greatly exceed what was previously generally expected. The PTTs' planning departments will have to do some rapid rethinking.

Of the 30% growth in data connections in Europe accounted for by the public data networks, the ratio of packet switching to circuit switching will be two to one. Meanwhile, leased circuits are expected to hold their share of the market, while the use of the telephone network for data is expected to halve in percentage terms while staying steady in terms of actual volume, the report said.

The real strength of the public networks will be not so much their technical advantages as the fact that they should be able to offer users cost savings. Logica believes that the Eurodata study can point up ways of optimizing the tariffs to meet the objectives of the PTTs and the requirements of the market — to create maximum appeal against private leased circuit networks, for example.

If the public data networks prove to be as successful as predicted by the Eurodata study, there will also be considerable opportunities for the manufacturers including the provision of 800,000 terminals using X.25 packet switching by 1987 — supported by 43,000 front-end ports to host computers — and of 175,000 ports to accessing circuit switching networks.

Higher Transmission Rates

Another finding emphasized in the report is the predicted move to higher data transmission rates with users saving on transmission costs by using the faster 4,800 and 9,600 bit/sec rates.

The number of terminals is expected to grow even faster than the number of network connections because of an increasing tendency to cluster two or more terminals onto each network termination point. CRTs will continue to be the most widely used terminals, growing from 50% to a share of almost 60%. However, the biggest growth will be in the use of banking terminals which are expected to increase more than 50 times in number to 42,000.

Overall Western European traffic in terms of the numbers of transactions per day will rise by nearly six times from 136 million to 790 million in 1987 (where a transaction is a completed task such as an airline booking or a data enquiry). In terms of bits, that is a total volume of 10 million million bits of data communications traffic in 1987.

That, at any rate, is the predicted demand. The question is: "Will the PTTs be able to cope?"

The Eurodata report, for which Logica was the prime contractor, took two years and involved 50% man-years of effort. It is based on statistical data gathered mainly from the PTTs and on 2,800 face-to-face interviews.

Foreign Orders & Installations

The UK's Royal College of Nursing has ordered a Honeywell, Inc. Level 64/DPS medium-scale computer system valued at approximately $450,000. In addition to a 768K-byte central processor, the system will include 600M bytes of disk storage capacity, tape unit, 1,000 line/min printer and 18 CRT terminals and three terminal printers.

National Bus, UK's national bus authority, has ordered three mainframe processors and 31 minicomputers from Univac for the establishment of a nationwide distributed data processing network.

Saitama Prefectural Credit Federation of Agricultural Cooperatives, near Tokyo, has ordered a Honeywell, Inc. large-scale dual processor DPS 8/70 computer system valued at about $5 million. The computer is to be the nucleus of an extensive on-line agricooperative banking system that will communicate with 645 terminals across the Saitama prefecture.

The Eastbourne Waterworks Co., which supplies water to 90,000 households and 3,500 industrial consumers over a 320-square-mile area in East Sussex, England, plans to install an NCR Corp. V-8555M computer system in December.

Yamanashi Chuo Bank Ltd., headquartered in Kofu, Japan, has ordered Univac computer equipment valued at $6.2 million to improve customer services and increase management efficiency.

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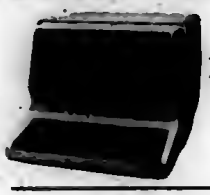

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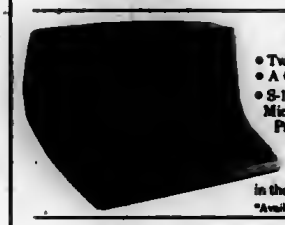

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Some Workshops Feeling Pinch of Recession

(Continued from Page 71)

ing the DP Professional," but only two sessions in March and April came off.

• In-house educators report a surge in business. There is no expensive travel and everyone sings out of the same hymnbook, observed one DP educator.

Education and the related travel and hotel expenses are the first to be cut in tight fiscal periods, a random survey of a dozen seminar and conference givers showed.

The softening first started when the prime rate peaked in April, reported Robert T. Santis, president of EDP Security of Waltham, Mass. Registration since has been "reasonably consistent" at each session around the country.

Other educators, however, report their attendance is still off by two or three participants per session.

Exceptions Exist

There are many exceptions, however, depending on the topic and the location of the seminar or conference.

Data Processing Security, Inc. of Fort Worth, Texas, had to cancel a seminar the week of Sept. 8 in Minneapolis, but already has 10 registrants for the same session in early December in San Diego. Minneapolis was a poor site at this time, observed Steven H. Dark, who coordinates seminars for Data Processing Security.

Houston is the hot spot where business is up, reported Karen Guth, president of Performance Development Corp. (PDC) of Princeton, N.J., which is offering data base seminars and in-house education. PDC has purposely avoided Chicago because of the sagging business clime.

Guth has also found sessions are getting more local and regional attendance. "It's not that there's no money for education, but there's a reluctance to spend for the long trips," she said.

Hot Topics Needed

Seminars that are doing well are offering hot topics; the ones suffering are technical and personal development training, said William R. Leitch, president of the CW Conference Management Group. Hot topics include telecommunications, productivity, office automation, distributed data processing, structured programming and other new specialized areas.

Course business for Improved System Technologies is "very strong," 50% ahead of last year, and President Chris Gane believes it's because the company is addressing productivity. "The work we are doing, structured analysis and structured design, is increasing people's productivity," Gane said.

Yourdon, Inc. in New York has also found heightened interest in productivity improvement through structured programming, which it pioneered. "However," said Antonia Yourdon, executive vice-president, "companies are scheduling the classes tighter — two months ahead instead of a year."

"We projected 75 to 100 and already we have 180 for a conference on debit cards," reported Phyllis Orenstein at the Electronic Funds Transfer Association (Efta) in Washington, D.C. Like a bank credit card, the debit card immediately deducts the purchase at the time of the transaction, more like a check.

"I don't think it's fair to say this is a trend," Orenstein said. "It depends on the topic — this conference is the first of its type." The debit card conference, at $385 for nonmembers and $285 for Efta members, is $100 to $150 less than tuition generally charged for two- to three-day sessions.

Higher Levels Succeed

Another best-seller is the Ninth Comparative Data Base Management Systems National Conference sponsored in October in Los Angeles by the University of California at Los Angeles (UCLA) Extension.

Centronics Restructures

HUDSON, N.H. — Centronics Data Computer Corp. has announced a rearrangement of the company's management and a new business structure with an eye toward supplying the microcomputer user.

"We expect 1981 to be the start of a dramatic increase in the demand for our printers, with the microcomputer printer area our most dynamic opportunity," Michael D. Kaufman, Centronics president, said. "We feel that the number of microcomputer printers sold during the next 12 months could come close to the total of all printers shipped in our 1980 fiscal year.

"At the same time, we are also beginning to gear up for production of some exciting new products, including the Quietwriter."

Centronics' products have been grouped into three business areas and a line vice-president has been named to manage each business area.

George R. Rea, former vice-president of sales/marketing, has been named vice-president of the microcomputer business area. Centronics' industrial printer business will continue to be headed by Robert W. Kilcullen, who was promoted to vice-president. William H. Chalmers, who joined Centronics from Digital Equipment Corp.'s Peripherals Division, has been promoted to vice-president, with continuing responsibility for developing the Quietwriter business.

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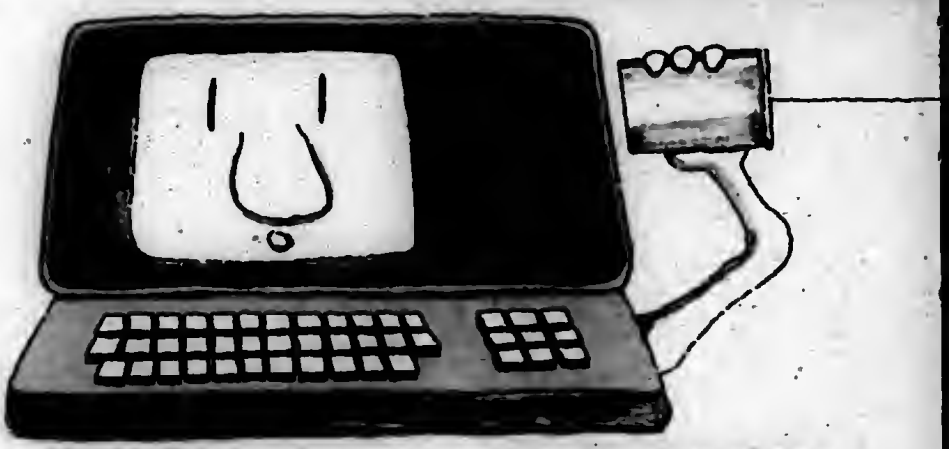

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Common Software. With BBN, software is the same at each node. Already in place throughout the network is the Interface Message Processor (IMP) program to handle packets from both hosts and other nodes. A program variation, Terminal Interface Processor (TIP), supports terminals as well as hosts.

Maintenance costs are now dramatically reduced. More important to the designer, system configuring couldn't be easier.

Equality among nodes. For flexibility all BBN nodes are created equal. When you add or subtract sites, the change is automatically sensed and accepted throughout the network. No special hardware, software change or system redesign is required.

Superior Message Control. Importantly, BBN networks deliver messages in milli-seconds, not minutes. They do so with superior message control. Routing control. Error control. Status control. Traffic control. It's all automatic—the host node even receives an im-

While Others on Hot Topics Staying Strong

Attendance has been about 150, but this year 170 are expected, said Mike Reilly, assistant director of the Department of Management, Labor and Business Administration at UCLA Extension.

The conference for high-level data base administrators and their executives is at such an elevated level, that it isn't impacted by discretionary budget-related decisions, Reilly suggested.

"It's not only the air fares," said Rob Muirhead, assistant manager of conferences at the Institute of Internal Auditors (IIA). "Whoever's signing off on the seminars is also looking at the $69 to $79 a night hotel rooms." Muirhead guessed it is not unusual for an employee to spend $1,000 for tuition and conference expenses — and that says nothing about time away from the job.

To beef up attendance at an October Atlanta conference on Systems Auditability and Control, IIA, besides mailing to its 24,000 members, sent 17,000 brochures to the Data Processing Management Association and planned three large ads in *Computerworld*. Response has been so limited that it canceled the third *Computerworld* ad, a spokesman said.

In a recessionary time, discretionary funds are the first to be cut and those discretionary funds in the past went for management training such as Ubi Enterprises attempted with its first public session on "Managing the DP Professional," according to President Ursula Bleth Connor. Despite disappointing interest in the U.S., the program is now going to be offered in Brazil and others have become interested in other Ubi educational services because of the workshop promotion, Connor said.

Joseph Ferrara, vice-president of the Diebold Group, observed the trend from another perspective. "Hotels are a lot easier to negotiate with; booking meetings and locations is a lot softer," Ferrara said. Most of the Diebold sessions are for subscribers to the Diebold service.

The American Management Association (AMA) sponsors about 3,500 meetings a year. This year's attendance, which averages 23, is down about two registrants per meeting, reported Robert M. Newton, AMA director of public relations.

There is one bright spot. Those firms providing in-house education report a spurt in business.

Datapro Research Corp. offers more than 100 sessions all around the country. Although there's no decline in enrollment because many of the attendees are Datapro subscribers, there has been an increase in interest for in-plant training, according to Joseph F. Menendez, manager of seminars.

"From the recession point of view it's cheaper to train people already in the organization than to pay the agency fees to bring in someone new," said Joseph E. Wehr Jr., vice-president of Data Base Management, Inc. of Vernon, Conn., which is currently offering IMS and CICS courses.

Turn Key Systems, Inc. in Norwalk, Conn., which provides software support and education for National CSS, has also found an increase in requests for in-house training, according to Connie Galley, manager of educational services. However, she's uncertain if the trend will continue.

"This is a very cyclical business. The first six months are always higher than the last."

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Aydin Forms New Operation

FORT WASHINGTON, Pa. — Aydin Corp. has formed an operation to develop and market products in digital telecommunications, specifically in time-division multiple access (TDMA) systems, for satellite communications.

Dr. Joseph Deal has joined Aydin to head the development of products for this new operation.

Deal was previously Comsat Laboratories' department manager in TDMA systems.

The new operation will initially be based on the West Coast at the Aydin Microwave Division in San Jose, Calif.

Aydin designs, manufactures and sells microwave and digital data communications products and systems, computer-controlled color display terminals and high-power electronic equipment for fusion experimentation.

HP Service Catalogs Desktop Programs

PALO ALTO, Calif. — Hewlett-Packard Co. is offering a service to make it easier for software suppliers to market their Basic language scientific and engineering software to HP System 35 and System 45 desktop computer users.

The Software Catalog Service provides program descriptions in several application areas, including aeronautical, electrical, mechanical and civil engineering; mathematics and statistics; life and physical sciences; business management; computer utilities; and a special section on assembly language, which is an option on HP's desktop systems.

For more information on the HP Software Catalog Service, third-party software suppliers should write on letterhead to Market Development Manager, HP Desktop Computer Division, 3404 E. Harmony Road, Fort Collins, Colo. 80525.

Nickels & Dimes

Compuscan, Inc. expects to report losses of approximately $6.5 million on revenues of approximately $18.2 million for its fiscal year ending May 31, 1980. Approximately $4.7 million of these losses will be attributable to discontinuance of its Start and Comap text editing product lines, previously sold to the graphic arts industry, and a $700,000 extraordinary noncash charge relating to the exchange of its subordinated debt for common stock.

Compuscan has been engaged in preliminary merger discussions with Hendrix Electronics, Inc., a manufacturer of text processing systems and optical page readers located in Manchester, N.H. No agreement has been reached on the terms or conditions of the possible merger.

Microcomputer Systems Corp. has been awarded a $1 million contract to supply custom-developed disk drive controllers to Microdata Corp.

$ $ $

American Management Systems, Inc. announced that it intends to file a registration statement with the Securities and Exchange Commission for a public sale by the company of approximately 150,000 shares of its common stock. The offering is expected to take place this month.

$ $ $

Sidereal Corp., a terminal manufacturer, has concluded equity and line of credit arrangements. The funding will be used for working capital requirements, new product development, marketing programs and corporate expansion.

$ $ $

Chromatics, Inc. has raised more than $4.1 million to finance additional expansion and new product development in a private sale of stock.

$ $ $

Wang Laboratories, Inc. announced that it intends to call for redemption on Oct. 3 all of its $50 million principal amount of 6.75% convertible subordinated debentures due 2004 and all of its $50 million principal amount of 8% convertible subordinated debentures due 2005. Wang has filed a registration statement with the Securities and Exchange Commission covering the issuance of a maximum of 2,593,199 shares of Class B common stock upon coversion of the debentures.

$ $ $

Topaz, Inc. has announced a 3-for-2 stock split effective and payable Sept. 26 for shareholders of record Sept. 15.

$ $ $

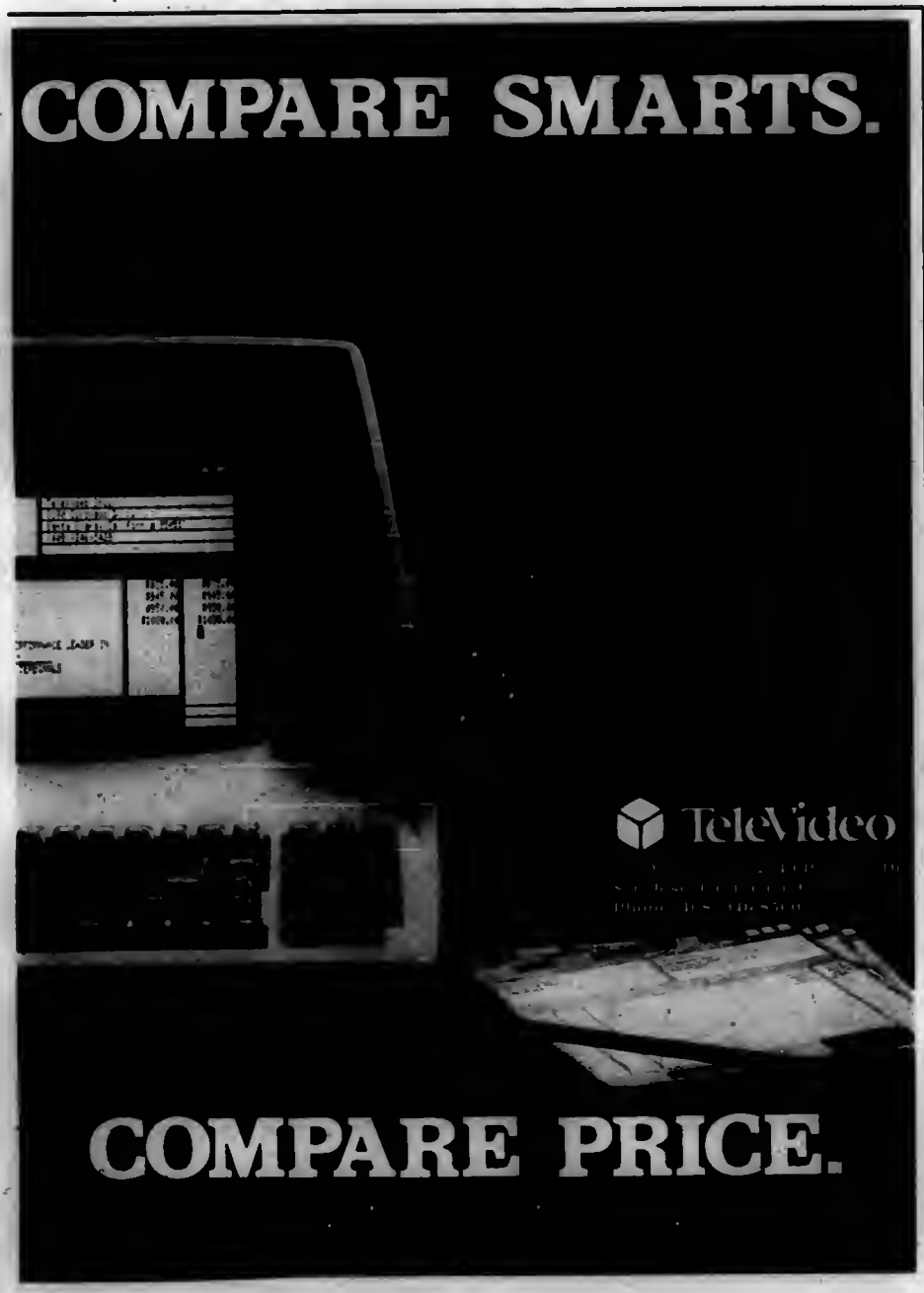
Varian Associates, Inc.'s board of directors has declared a regular quarterly cash dividend of 13 cents per share payable Oct. 31 to shareholders of record on Oct. 15.

$ $ $

Amdax Corp. has concluded a major financing package whereby seven venture capital firms have invested $2.1 million in the firm. The investors are Business Development Services, Inc. (a wholly owned subsidiary of General Electric); Collier Enterprises; Pioneer Investors Corp.; Doan Resources; International Industrial Interests, Inc.; Adler & Co.; and American Diversified Enterprises, Inc.

$ $ $

Informatics, Inc. has filed a registration statement with the Securities and Exchange Commission covering a proposed public offering of 1,267,250 shares of common stock. Meanwhile, Informatics and the Equitable Life Holding Corp. jointly said they know of no developments to account for the recent increases in the trading volume and market prices for the common stock of Informatics in the over-the-counter market.



Orders & Installations

The Riverside Regional Education Data Center of Riverside, Calif. has ordered a Burroughs Corp. dual processor B6900 computer system to institute extensive on-line student accounting and financial-payroll applications for 54 school districts in Southern California.

Norand Corp., Cedar Rapids, Iowa, has received an order for 462 of its Alpha-1 hand-held data entry terminals and associated transmission equipment valued at approximately $1.1 million from Federal Express Corp. of Memphis, Tenn.

MIT has ordered and is now installing a Honeywell, Inc. large-scale Level 68/DPS Multics computer valued at about $4 million.

Genuardi Markets, Inc., a supermarket chain in the Delaware Valley, has ordered a Univac System-90.

Contracts

BDS Computer Corp. has been awarded a contract by the General Services Administration for plug-compatible line printers, controllers and interfaces.

Report Cites 23% Growth Rate

Printer Market Seen Hitting $10 Billion by '88

NEW YORK — The computer printer market will reach $10 billion in 1988, growing at a compounded annual growth rate of 23%, according to a report by Frost & Sullivan, Inc. (F&S).

While today's models use as many as 30 different technologies, there will be major shifts between the two dominant ones, nonimpact and impact, with the former making large gains, the report said. (For growth projections by hardware category, see adjacent box.)

Nonimpact technologies provide higher speed and improved print quality and offer greater reliability as a result of their electronic basis, as opposed to mechanical designs. "They also offer opportunity for higher profit margins," the survey noted.

Electrostatic, thermal, laser and other nonimpact printers will gain 40% of the market in 1988 compared to 7% last year. "Our survey indicates user acceptance with the absence of multiple copies the only significant objection," F&S said, adding most users say they are "willing to live with the deficiency" or "work around the problem."

Dramatic Gains

The most dramatic gains will occur at the market extremes. At the high end, laser-xerographic applications will gain more than sixfold in market share — from 2% in 1979 to 13% in 1988. At the low end, ink jet printers will do even better, going from a negligible market share in 1979 to 14% by the end of the forecast period.

In dollar volume, electrostatic printers will grow from $39 million last year to $613 million in 1988 because of graphics applications. However, improved resolution and appearance of ink jet applications will compete strongly with electrostatic techniques toward the latter half of the decade, the report said.

Gains will also be chalked up by laser-electrographic printing whose 1% market share will increase to 3% by 1988, while impact-type printers' dominant 92% market share will decline to 61%.

Within that category, full-character serial printers will retain the lead position. But matrix printers will come to hold nearly twice the market share as band printers, and the market share held by drum and chaintrain printers will also decline, each to 1% by 1988.

Trends in distributed processing and data communications are proving the spur to the printer boom, F&S claimed. The survey indicated each system installation will have an average of 40 nodes, and "most will require a printer."

In addition, user respondents "strongly selected" medium speed transmission and on-line operation for their printers. "This places a premium on higher speed printers," F&S said, adding "An overlap of computer and communications have blurred traditional functional boundaries."

The survey characterized the printer marketplace as one in upheaval and constant change, with rapid technological developments and continuous downward price pressures. Independent, plug-compatible printer vendors, for example, shift to OEM marketing to obtain volume business, and such shifts will continue and even intensify.

The survey, entitled "The Computer and Communications Printer Market," costs $900, the vendor said from 106 Fulton St., New York, N.Y. 10038.

1979-1988 Compound Annual Growth Rate

Hardware	
Mainframe computer systems	23%
Small business computers	22%
Low-priced	29%
High-priced	17%
Communications	26%
Terminals	9%
Word processors	24%

Growth Projections by Principal Market Sector

Royal Sells Dataroyal Stake

NASHUA, N.H. — Royal Business Forms, Inc. has sold the balance of its equity interest in Dataroyal, Inc. to Dometic, Inc., a subsidiary of AB Electrolux, for an undisclosed amount of cash.

Prior to the transaction, Dataroyal, Inc. was owned by Dometic, Inc., Royal and Dataroyal Management.

The sale by Royal was the last in a series of steps that began in May 1978 as part of a program initiated by Royal to reduce its obligations and risks in areas outside its immediate expertise in the forms industry.

This advertisement is neither an offer to sell nor a solicitation of offers to buy any of these securities. The offering is made only by the Prospectus.

NEW ISSUE September 5, 1980

1,350,000 Shares

Amdahl Corporation

Common Stock

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Price $28.375 per share

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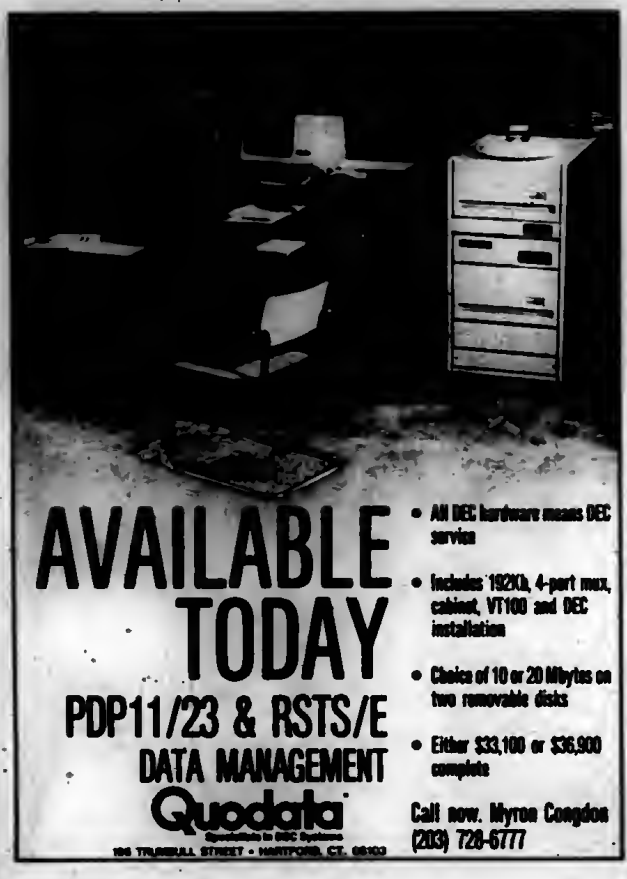

Executive Corner

▲ William S. Wheatley Jr. has been elected president of the American Satellite Co.

• Dan Trunk has been named vice-president of marketing for Computer Associates.

• The Prentice Corp. has named Karl H. Moeller Jr. corporate vice-president of finance.

▲ D.E. Eckdahl, senior vice-president of NCR Corp.'s Engineering and Manufacturing Group, has resigned to pursue other interests. W.F. Buster, currently vice-president of the Computer Systems Division, has been appointed to replace Eckdahl.

• Graham O. King has been promoted to president and chief executive officer at the Auto-trol Technology Corp.

• David H. Zirkle has been appointed vice-president and controller for Northern Telecom Systems Corp.

▲ Dr. Joseph Burns was elected vice-president of Mikros Systems Corp.

• Paul H. Till has joined United Communications Systems, a subsidiary of United Telecommunications, Inc., as vice-president of planning.

• Walter S. Jonsson has been named vice-president of sales for T-Bar, Inc.

• Threshold Technology, Inc. has appointed Joseph J. Bove vice-president of marketing.

• Pat Warren has just been named vice-president of technical services at Business Application Systems, Inc.

• Andrew W. Mathews has been elected vice-president of marketing at Visual Technology, Inc.

• E-Systems, Inc. has appointed Billy Hooker vice-president of advanced systems; Franklin Stapp vice-president of electronic Warfare; and Dr. Phil Rogers vice-president of electronic systems software.

• Peter S. Anderson has been promoted to senior vice-president of marketing at Mohawk Data Sciences.

• Anthony Middleton has been named vice-president of systems and programming in the minicomputer division at Data Communications Corp.

• Earl Andrew has been made vice-president of manufacturing at Data Electronics, Inc.

• Marvin Crumb was appointed president of U.S. operations at the Mannesmann Tally Corp.

• William Robinson has been appointed vice-president and head of Commodore Business Machines Computer Systems Division.

• Jack Comish has been promoted to vice-president of technical services for Intertek Services Corp.

• Robert E. Wilcox has been promoted to vice-president and director of operations for ITT Datanetics Corp.

• John Bentley Jones has been appointed vice-president, Systems and Support Division, and Robert F. Teitel has been named technical director of data research and analysis at Maxima Corp.

• Holly Hobart has been promoted to manager of management information services at Tymshare, Inc.

• Charles R. Bush has been appointed vice-president of program management at MSI Data Corp.

• Andrew Krycerick has been named vice-president of engineering for Wespercorp.

• Qume Corp. has announced the appointment of five new officers. The new officers are David Mans, vice-president of finance, comptroller and treasurer; Jack Jamieson, vice-president of research, development and engineering; Gail James, vice-president of marketing, Memory Products Division; Allan McVicar, vice-president of operations, Memory Products Division; and John DeSantis, vice-president of operations, Printer Products Division.

• Richard W. Brail has been promoted to director of international sales and support for MSI Data Corp.

▲ James E. Herlinger has been appointed vice-president of Plantronics/-Santa Cruz.

• Thomas J. Spadafora has been named vice-president and division manager of the Transmission Products Division at Timeplex, Inc.

▲ John R. Walker has been appointed executive vice-president at Ontel Corp.

• Mike Gray has been named vice-president of research and development for Zitel Corp.

• D. Otis Wolkins has been named president of GTE Microcircuits Division.

• Robert S. Buzard has been appointed vice-president of marketing for E-Systems, Inc., Commercial Division.

• Dr. Jan Prokop has been appointed senior vice-president of computer services and Edward W. Green has been appointed vice-president for information product development at Data Resources, Inc.

• Mel W. Bosch has joined Integral Data Systems, Inc. as director of oem marketing.

• D. Jerry Bowman has been promoted to senior vice-president and director at Comserv Corp.

• Walter B. Davis Jr. has been appointed director of international marketing for Bunker Ramo Corp.'s Information Systems Division.

• TEI, Inc. Chairman and President Garry Walker has appointed four new vice-presidents. Harry H. Rayner has been promoted to vice-president of sales, Pat McCormick to vice-president of manufacturing, Davis S. Bennett to vice-president of planning and development and Wallace Berry to vice-president of production engineering.

• Richard M. McCraney has been named vice-president of sales, Robert P. Berry has been named vice-president of field engineering and Gary A. Land has been named vice-president of product management at Memorex Corp.

Supershorts

Electronics/China 80, the first exhibition restricted to U.S. companies as exhibitors ever staged in that country, attracted more than 40,000 executives from every province in the People's Republic of China except Tibet.

Informatics, Inc. has established headquarters in Germany for operations in Central Europe. The operation will encompass all three business segments of Informatics — software products, professional services and data services. The operation will be built around the existing subsidiary, Informatics GmbH, and will be headquarterd in Dusseldorf, West Germany.

NTSC, Sycor Alumni to Produce Winchesters

By Rita Shaer
CW Staff

ANN ARBOR, Mich. — Approximately one year of start-up time and product development is producing results with the announced formation of Irwin International (II) here.

The firm will be guided by alumni of Sycor, Inc., a manufacturer of computer terminal systems, and Northern Telecom Systems Corp. (NTSC), formed when Northern Telecom Ltd. (NTL) merged Sycor with Data 100 Corp. in 1978, according to an II spokesman.

II's first product — dubbed the Irwin 510 — is a 5.5-in. Winchester disk drive system introduced by Samuel Irwin, president and chairman of the board, in conjunction with the formal announcement of II's formation.

Privately Held Firm

Irwin is a former president and chairman of Sycor who was with that company from its start-up in 1967 through its sale in 1978. Although he preferred not to reveal the details of II's financial structure, Irwin described himself as "the major investor" and indicated that the firm is privately held with no need to "resort to the debt market" so far.

Among the II executives who chose to leave NTSC are Paul Cochlan, vice-president and chief operating officer, and Donald Pate, senior vice-president in charge of marketing. Several months ago, NTL acknowledged that there had been some problems with the consolidation operation because of the turmoil created by personnel turnover among the executives in the companies acquired to form NTSC (CW, July 21).

II has a lease on 24,000 square feet of administration, research and engineering space in Ann Arbor with another 8,100 square feet of pilot manufacturing space in a nearby building, Irwin noted.

The company is also hoping to purchase an existing plant in northern Michigan for a manufacturing and assembly facility. This would give II approximately 50,000 square feet of space for its equipment production, he said.

Integrated Cartridge Backup

Specifications for the Irwin 510 include a storage capacity of 10.2M bytes formatted with an integrated cartridge tape backup, Irwin said. The backup system allows all of the formatted data to be dumped and restored on the backup tape cartridge "in less than four minutes," Cochlan claimed.

Average access time of the unit is said to be 25 msec — reportedly twice as fast as most 8-in. Winchesters.

The 510 will be aimed at both small and large OEMs, systems integrators and distributors, according to Pate. "At this time, we will only sell to end users if a particular end user is large enough to justify our interest," he said.

Although he conceded that no distributors had yet been formally signed up, he maintained that this was because the completed distribution contract "wasn't back from the lawyers yet."

Standard Winchester design components have been utilized in the basic 510 system, Cochlan said and claimed that "most of the technology has been proven on larger, more expensive equipment — what we've done is find ways to reduce size and complexity."

The package is priced at $1,500 per unit in OEM quantities of 500, Irwin said. This breaks down to a cost of 12.2 cents per 1K byte, he said. II is building 100 units for customer evaluation in early 1981 and expects to be at a production stage enabling it to build about 7,500 units that year by May 1981, Cochlan noted.

The firm, which currently employs 35 people, is headquartered at 200 Green Road, Ann Arbor, Mich. 48105.

Expansions

A.B. Dick Co. of Chicago has announced plans to open the Phoenix Computer Development Center to be located in Scottsdale (Ariz.) Industrial Airpark. The facility will operate as a section of the company's Research and Engineering Division.

Intertel, Inc. has completed a move to an 83,000 sq ft headquarters building in the Andover Tech Center Industrial Park. Its address is 6 Shattuck Road, Andover, Mass. 01810.

Genrad Semiconductor Test, Inc., a subsidiary of Genrad, Inc., has broken ground for its permanent development and manufacturing headquarters in Oak Creek Business Park, Milpitas, Calif.

STSC, Inc. (formerly Scientific Time Sharing Corp.) is building new corporate headquarters in Bethesda, Md. The building is located at 2115 E. Jefferson St. in Rockville, Md.

Computrend, Inc. has announced the signing of a long-term lease on a 16,100 sq ft facility on Rt. 128 in Woburn, Mass. The facility at 13 Wheeling Ave., will house Computrend's national service organization, warehousing operation and its Boston sales and service group.

Data Card Corp. has announced the start of construction of a 14,700 sq ft addition to its Plastics Division in Buena Park, Calif.

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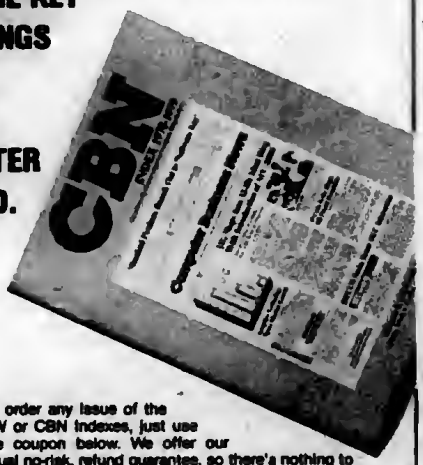

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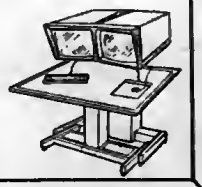

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Candidates should possess the following qualifications: extensive experience in data processing, information systems and computer management in a comprehensive university environment; educational qualifications commensurate with an academic appointment; and outstanding interpersonal, verbal, and written communication skills. Nominations, applications, and resumes should be submitted by October 15, 1980, addressed to Dr. Kenneth B. Cook, ADMIN 408, University of Arkansas, Fayetteville, AR 72701.

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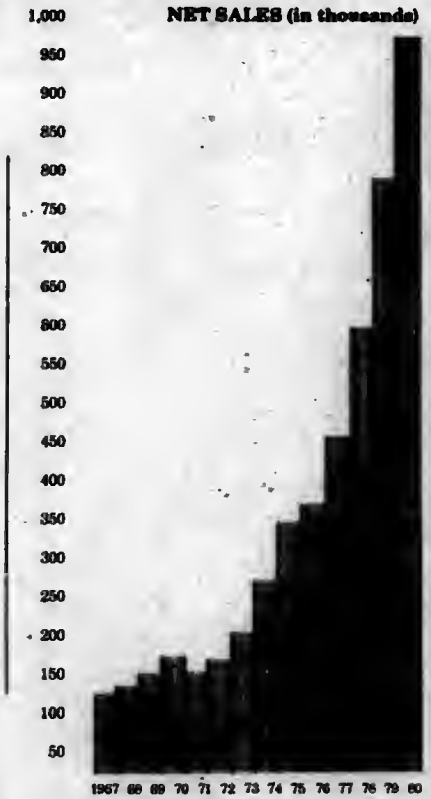

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The Urbana-Champaign Office of Administrative Information Systems and Services has an opening for a permanent Assistant Director. This position is available October 15, 1980 or as soon thereafter as possible.

This position is responsible for evaluation, planning and implementation of all administrative data processing systems developed at the Urbana campus. In conjunction with directors and heads of various campus units, as well as other high level campus administrators, you will have the responsibility for evaluating various campus administrative functions, recommending appropriate data processing solutions, and managing the implementation of these solutions.

Applicants must have a bachelors degree in computer science, business or a similar technical field, a minimum of five years in supervision or management of data processing activities including system design and project management; ability to work with individuals and groups as a variety of problems and good communication skills. Other characteristics desired, but not necessarily required, include an advanced degree and experience in data processing in higher education.

Salary will be commensurate with experience and qualifications. Applications and inquiries may be directed to:

John B. Mellanus, Director
Urbana-Champaign Office of Administrative Information Systems and Services
54 Administration Building
University of Illinois
Urbana, Illinois 61801
217/333-4839

For full consideration, letters of application (including resume) should be submitted by October 1, 1980

The University of Illinois is an Affirmative Action/Equal Opportunity Employer.

DIRECTOR OF COMPUTER SERVICES

MANKATO STATE UNIVERSITY

Mankato State University invites applications for the position of Director of Computer Services.

Mankato State is a comprehensive, multi-purpose regional university located in south central Minnesota in a city of approximately 44,000 persons, including over 10,000 Mankato State University students.

The position is responsible to the Director of Administrative Services for the operation and management of the Computer Center including all its services to the University, the State University System, and the Minnesota Educational Computer Center. The Director supervises 20 professional and 20 student employees.

A position description and application materials are available by writing or calling the Personnel Office, [illegible] Box 47, Mankato State University, Mankato, Minnesota 56001, (507) 389-6046. Salary $23,344 - $33,410 dependent upon qualifications. Deadline for return of applications - October 1, 1980. Starting date - November 1, 1980. Applications from handicapped, minorities, and women are encouraged.

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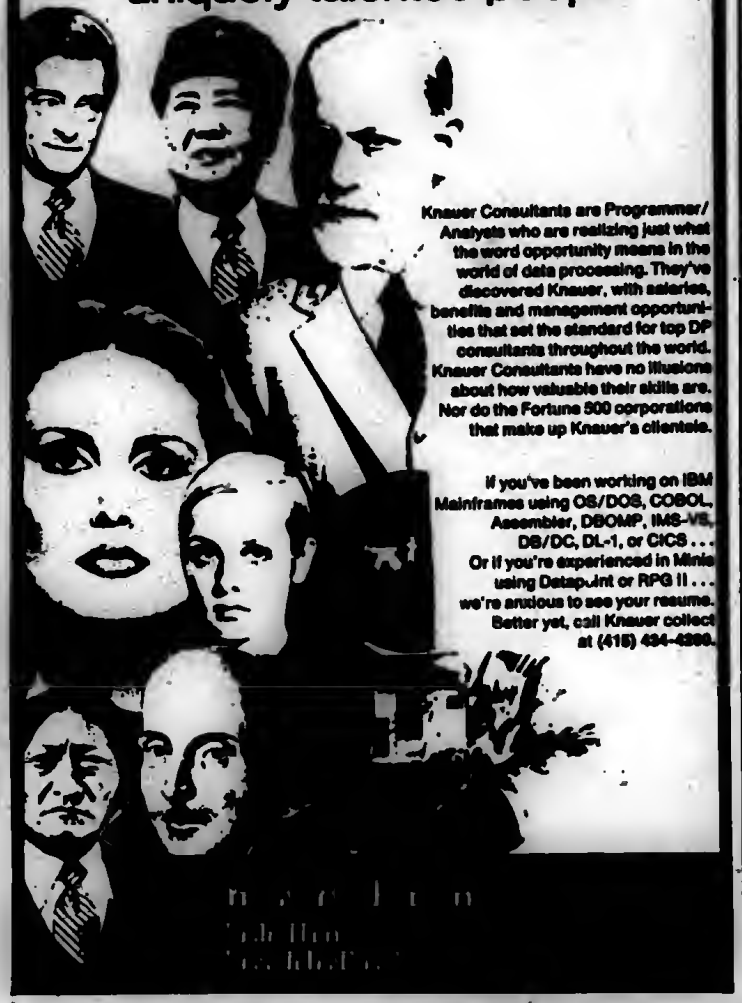

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The position assumes responsibility for directing data quality assurance, computing and administrative activities. This will include supervision of programmers and statistical analysis support personnel, development and implementation of procedures and specifications, allocation of resources, and tracking of projects.

Candidates should possess a Master's Degree and a minimum of 5 years experience in the use of time sharing, data processing and development of scientific computing applications, including 2 years of supervisory experience.

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- **ENGINEERING ANALYSTS:** Responsible for developing and evaluating math models of spacecraft/aircraft sub-systems including control surface actuators, landing gear systems, etc., for use in large scale digital simulation. Applicants should have a knowledge for modeling dynamic systems.
- **CONTROL SYSTEMS ENGINEERS:** With experience in digital control systems to perform simulation and analysis of spacecraft/aircraft flight control systems. Applicants should have the knowledge of FORTRAN and be familiar with the use of digital and computer analysis of control problems.
- **SCIENTIFIC PROGRAMMERS:** Analyze scientific, engineering and mathematical problems and develop numerical models and programs for their solutions on high speed digital computers. Applicants should have a thorough knowledge of FORTRAN and be familiar with the use of large scale computers.
- **SIMULATION APPLICATIONS:** Support the development, evaluation and operation of a large dynamic simulation dedicated to Shuttle Flight testing. Applicants should have worked with spacecraft/aircraft GUIDANCE, NAVIGATION AND CONTROL SYSTEMS.
- **MECHANICAL/AEROSPACE ENGINEERS:** Responsible for development and use of programs for structural, thermal or electromechanical Control Systems analysis. Applicants must be familiar with and capable of effectively utilizing large scale digital computers to the analysis of engineering problems.
- **COMMUNICATIONS ENGINEERS:** Support performance analysis of various communications and tracking links operated by spacecraft/aircraft. Applicant should be familiar with TACAN, MSBLS, and GPS SYSTEMS, have the ability to develop and evaluate math models, have a high level of competence and written communications and have a knowledge of FORTRAN.
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WALKER RESEARCH, INC.
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[illegible]
Indianapolis, Indiana [illegible]
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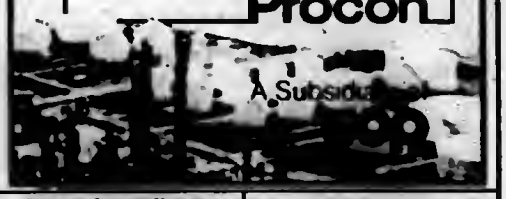

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The National Center for Appropriate Technology seeks individual to develop (make and and debug) software and identify and design computer applications for NCAT business and engineering tasks. Additional responsibilities for preparing software documentation and providing user training in the use of computer system/software. Supervisor responsibility of NCAT programming staff. Specialized knowledge of computer data analysis techniques, computer modeling, computer programming including FORTRAN, Statistics and Engineering Principles highly desirable. Salary range: $17,000-35,000. Resumes by Oct. 1 to Personnel Office, NCAT, P.O. Box 3838, Butte, MT 59701. 406/494-4572.

AA/EOE

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The language of instruction in the Department is English.

Application forms may be obtained from:

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Kuwait University Office
4201 Connecticut Avenue, N.W.
Suite 404
Washington, D.C. 20008

Completed applications, together with non-returnable copies of academic qualifications and representative publications, must be returned to this office by December 15, 1980 or by registered post directly to:

Department of
Administrative Affairs
Kuwait University
P.O. Box 5969
Kuwait

All applications must be received in Kuwait by December 31, 1980

Appointments are governed by the following considerations:

1) Rank and salary will be determined according to present academic position, qualifications and years of experience. There is no Kuwait income tax deduction.
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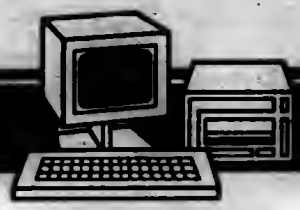

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Will Smith
Employment Manager

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To arrange a confidential interview send resume, including salary history, to:

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Guy L. Marlow
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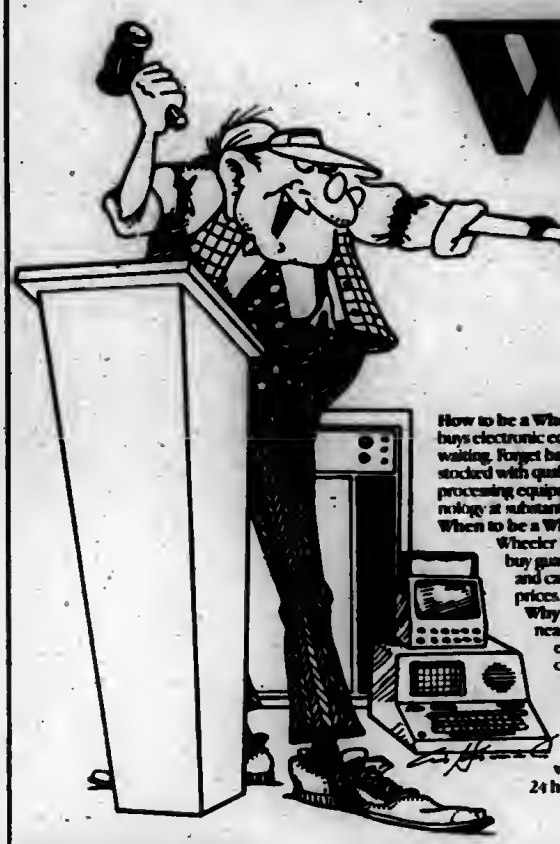

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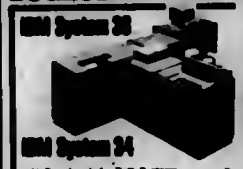

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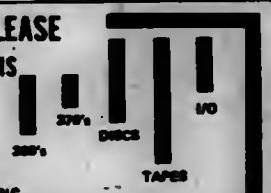

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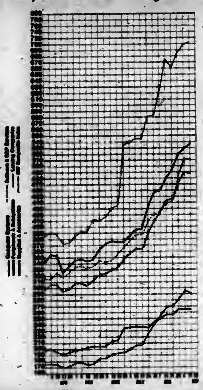

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CLOSING PRICES WEDNESDAY, SEPTEMBER 10, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

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A	AMDAHL CORP	19- 42	27 1/2	- 7/8	-3.0
N	BURROUGHS CORP	60- 86	66 7/8	-3	-4.2
O	COMPUTER AUTOMATION	9- 27	24 1/8	-3	-11.0
N	CONTROL DATA CORP	36- 75	72 1/8	-2 1/8	-3.2
N	CRAY RESEARCH INC	30- 84	77 1/8	-1	-1.2
N	DATA GENERAL CORP	46- 87	73	-12 7/8	-14.5
N	DATAPOINT CORP	40- 80	70	-2 1/2	-3.1
N	DIGITAL EQUIPMENT	52- 90	83 1/8	-3 3/8	-3.9
A	ECD INC	5- 12	29	+2 7/8	+10.2
N	ELECTRONIC ASSOC.	5- 30	21 1/8	- 1/4	-1.0
N	FOUR-PHASE SYSTEMS	20- 40	26 3/8	- 5/8	-2.2
N	FOXBORO	31- 56	52 1/8	+2 7/8	+5.7
O	GENERAL AUTOMATION	7- 29	2 3/8	- 1/2	-0.6
O	GRI COMPUTER CORP	1- 2	3/8	+ 3/8	+100.0
N	HEWLETT-PACKARD CO	46- 78	66 3/8	-3 5/8	-5.0
N	HONEYWELL INC	66-101	89 1/8	-2 7/8	-3.1
N	IBM	50- 79	66 1/4	-1 3/8	-2.5
O	MAGNUSON CORP SYSTS	20- 35	32 1/8	-2 1/2	-7.1
N	MANAGEMENT ASSIST	5- 24	21	-2	-8.6
O	MANUFACTURING DATA S	22- 84	49 1/8	+3	+6.4
O	MINI-COMPUTER SYST	3- 8	4 1/8	- 1/8	-2.7
O	MODULAR COMPUTER SYS	9- 25	22	-2 1/2	-10.2
N	NCR	52- 82	69 1/8	-2 7/8	-3.5
N	PRIME COMPUTER INC	19- 39	34 7/8	- 1/8	-0.3
N	PERKIN-ELMER	26- 60	57 3/8	-1 7/8	-3.1
N	SPERRY RAND	42- 60	52 5/8	-2	-3.6
A	SYSTEMS ENG. LABS	11- 41	41	+8 1/2	+26.1
O	TANDEM COMPUTERS INC	19- 49	46 1/8	+1 7/8	+4.0
N	TEXAS INSTRUMENTS	79-131	126 1/8	+1 1/8	+0.8
Z	WANG LABS.	17- 52	50 1/2	-1 1/8	-2.1

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 24	18 1/4	+ 1/2	+2.7
N	COMDISCO INC	6- 18	17 1/4	+1 1/4	+10.0
A	COMMERCE GROUP CORP	1- 2	2 1/8	0	0.0
A	COMPUTER INVSTRS GRP	3- 4	1 5/8	0	0.0
O	CONTINENTAL INFO SYS	3- 15	6 1/8	- 1/8	-2.5
P	DATRONIC RENTAL	3- 4	4	+ 1/4	+25.0
A	DCL INC	3- 8	2 1/8	- 1/8	-5.8
N	DPF INC	6- 10	7 3/8	- 1/2	-6.1
N	ITEL	1- 13	2 3/8	- 1/8	-5.0
O	LEASPAC CORP	3- 2	3/8	- 1/8	-14.0
A	PIONEER TEX CORP	2- 4	3 5/8	0	0.0
N	RELIANCE GROUP INC	29- 73	72 5/8	+1	+1.2
N	U.S. LEASING	18- 21	21 1/8	+1 1/4	+6.2

EXCH: EXCHANGE TYPE: A=AMERICAN; P=PHIL-BALT-WASH; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 2 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	4 1/2	+ 1/8	+5.8
O	ANACOMP INC	7- 17	17	- 1/8	-0.7
O	ANALYSTS INTL CORP	3- 8	8 1/8	- 1/8	-0.7
A	APPLIED DATA RES.	5- 21	20	+ 5/8	+1.0
N	AUTOMATIC DATA PROC	32- 50	49 1/2	0	0.0
O	COMPUTER HORIZONS	1- 2	2 1/4	+ 1/8	+7.1
O	COMPUTER NETWORK	6- 2	7 1/8	- 7/8	-10.9
N	COMPUTER SCIENCES	11- 28	27 1/4	+ 1/4	+0.9
O	COMPUTER TASK GROUP	1- 18	17 1/8	+4 1/8	+30.6
O	COMPUTER USAGE	2- 8	7 1/4	+ 7/8	+13.7
O	COMPUT AUTO REP SVC	4- 15	7 1/4	+ 5/8	+8.7
O	COMSHARE	11- 21	15	- 3/8	-2.7
O	CULLINANE CORP	13- 64	64	-3 1/2	-5.0
O	DATA DIMENSIONS INC	1- 8	1 3/8	0	0.0
O	DATATAB	1- 4	1	- 1/8	-11.1
O	DSI CORP	4- 9	4 1/8	- 3/8	-4.6
N	ELECTRONIC DATA SYST	19- 34	39 3/8	+8 3/8	+11.4
O	INFORMATICS INC	5- 25	22 1/2	-2 1/4	-9.6
O	INSTTE CORP	1- 8	2	-	-5.6
O	IPS COMPUTER MARKET.	2- 4	2 3/8	0	0.0
O	KEANE ASSOCIATES	3- 9	4 1/8	- 1/8	-2.9
O	KEYDATA CORP	3- 8	2 1/8	+ 1/8	+5.0
A	LOGICON	12- 26	26 5/8	- 1/8	-0.5
O	MATHEMATICA INC	5- 18	18	-2	-11.1
O	NATIONAL DATA CORP	10- 22	21 3/8	- 1/4	-1.1
N	PLANNING RESEARCH	5- 8	7 5/8	0	0.0
O	PROGRAMMING & SYS	1- 1	5/8	-	-8.2
O	RAPIDATA INC	4- 9	8 1/8	- 5/8	-7.1
O	REYNOLDS & REYNOLD	21- 34	34	0	0.0
O	SYSC INC	6- 14	14 1/4	+ 1/2	+3.6
O	SCIENTIFIC COMPUTERS	6- 27	24 1/8	+ 1/8	+0.5
N	TYMSHARE INC	34- 60	60 1/8	-1 3/8	-2.0
Z	URS SYSTEMS	5- 15	10 1/2	0	0.0
N	WYLY CORP	4- 18	16 1/2	-1 1/4	-7.6

PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	23 1/4	+2 1/8	+9.6
N	AMPEX CORP	14- 29	24 1/4	- 1/4	-0.5
A	ANDERSON JACOBSON	9- 17	12 7/8	-1 1/8	-8.0
N	APPLIED DIG DATA SYS	5- 30	11 3/4	0	0.0
O	AUTO-TROL TECHNOLOGY	10- 59	54 1/2	-2	-3.1
O	BEEHIVE INT'L	3- 14	10 5/8	- 3/8	-3.0
A	BOLT,BERANEK & NEW	12- 29	24 1/4	- 3/4	-2.7
N	BUNKER-RAMO	17- 24	24 1/4	+2 1/4	+12.2
O	CAMBRIDGE MEMORIES	1- 5	5 1/8	- 1/2	-12.5
N	CENTRONICS DATA COMP	20- 34	30	- 7/8	-2.2
Z	CETEC CORP	3- 7	7 1/8	+ 7/8	+14.0
O	COMPUTER DEVICES INC	5- 9	7 1/4	-1 1/4	-14.7
O	COGNITRONICS	1- 7	6 1/8	-1	-14.0
O	COMPUTER COMMUN.	4- 10	8 1/8	- 3/8	-30.5
O	COMPUTER CONSOLES	4- 29	10 3/8	- 1/8	-0.6
O	COMPUTER TRANSCEIVER	1- 5	2 7/8	- 1/8	-4.1
N	COMPUTERVISION CORP	24- 52	49	- 5/8	-1.2
N	CONRAC CORP	13- 25	24 1/8	- 5/8	-2.0
Z	DATA ACCESS SYSTEMS	5- 17	15 3/8	- 5/8	-3.9
Z	DATA PRODUCTS CORP	11- 31	28 3/8	-1 3/8	-4.6
O	DATUM INC	2- 4	3 1/8	- 1/4	-7.4
O	DECISION DATA COMPUT	2- 2	2 1/4	+1	+25.5
O	DELTA DATA SYSTEMS	1- 2	2 1/2	- 3/8	-13.4
N	DOCUMATION INC	7- 27	10 7/8	- 1/8	-3.0
O	DATARAM CORP	5- 27	38 3/8	- 1/8	-1.4
N	ELECTRONIC M & M	3- 8	8 1/8	+ 1/2	+6.2
O	EVANS & SUTHERLAND	21- 59	54	- 1/2	-0.6
O	FABRI-TEK	1- 4	2 5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 2	4 5/8	- 1/8	-2.6
O	GENERAL DATACOMM IND	12- 22	24 1/4	0	0.0
O	GENERAL TERMINAL CP	1- 4	2	- 1/8	-5.6
N	HAZELTINE CORP	12- 31	28 7/8	- 1/2	-1.6
N	HARRIS CORP	29- 48	43 1/4	+ 5/8	+1.4
O	INFOREX INC	1- 4	1	- 1/8	-10.2
O	INFORMATION INTL INC	8- 15	38 1/4	- 1/4	-1.7
O	INTEL CORP	46- 93	88 1/8	-3	-3.2
O	INTERSIL	13- 34	32 1/4	+5 7/8	+22.2
Z	LUNDY ELECTRONICS	4- 12	8 1/8	- 1/2	-5.8
O	MSI DATA CORP	5- 12	11 3/8	+ 1/2	+4.5
N	MEMOREX	10- 26	22 3/8	-1 1/4	-7.4
N	MOHAWK DATA SCI	10- 27	25 5/8	-1 5/8	-5.2
O	OMEX	2- 10	5	+ 1/2	+3.8
Z	PARADYNE CORP	10- 45	42 1/8	+1 1/2	+3.6
A	PENRIL CORP	5- 18	11 1/4	- 1/4	-2.6
A	RAMTEK CORP	10- 27	23 3/4	-1	-4.7
O	RECOGNITION EQUIP	8- 18	18	- 1/8	-1.2
O	SCAN DATA	1- 5	5	- 1/4	-7.4
N	STORAGE TECHNOLOGY	12- 22	18 7/8	0	0.0
O	SYKES DATATRONICS	16- 30	27 1/8	- 1/2	-1.2
O	T BAR INC	14- 21	30 1/2	+ 3/8	+4.2
Z	TEC INC	3- 5	8 1/4	- 1/2	-5.6
N	TEKTRONIX INC	42- 70	67	- 1/8	-0.7
N	TELEX	3- 4	8 1/8	- 4/8	-10.6
O	TESDATA SYSTEMS CP	8- 25	11 3/8	+ 3/8	+3.1
O	TIMEPLEX INC	7- 27	25 3/8	- 3/8	-1.4
O	WILTEK INC	1- 2	2 1/2	- 1/8	-4.7

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 14	12 1/4	- 3/8	-3.0
O	BALTIMORE BUS FORMS	1- 2	1/4	0	0.0
N	BARRY WRIGHT	19- 38	37 1/8	-1	-3.2
O	CYBERMATICS INC	1- 1	1	0	0.0
A	DUPLEX PRODUCTS INC	11- 15	14 1/8	+ 1/8	+0.8
N	ENNIS BUS. FORMS	13- 21	17 1/8	+ 1/8	+0.7
N	3M COMPANY	48- 60	57 3/8	-1 3/8	-2.3
O	MOORE CORP LTD	27- 34	38 1/4	+ 5/8	+1.1
N	NASHUA CORP	20- 34	29 7/8	+ 1/4	+0.8
O	STANDARD REGISTER	22- 31	29 1/2	- 1/2	-1.6
Z	TAB PRODUCTS CO	13- 26	25 1/4	+ 3/8	+1.4
N	WABASH MAGNETICS	11- 18	16	+ 3/8	+2.3
N	WALLACE BUS FORMS	23- 34	34	+ 3/4	+2.6

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